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FIRE RISKS FROM ELECTRIC LIGHTING.

We are glad to observe that the rules and regulations relating to the above subject, which were drawn up by the committee of eighteen eminent men of science, appointed by the Society of Telegraph Engineers and of Electricians, have been severely criticised by the correspondents of some of our contemporaries. At the time these rules were published in our columns we took the opportunity of expressing our opinions on their value to electric light engineers, and we see no reason to alter the course we then took. In our review we stated that in no part of the Committee's report was there any suggestion thrown out as to any simple or convenient means of following up the skeleton ideas therein contained. We could not at the time devote sufficient space to the matter for dwelling upon many of the points deserving of attention, but as the subject is one of considerable importance, it may be well to return to it. Speaking of the construction of a dynamo-electric machine, the Committee says :—"The insulation of its coils and conductors should be perfect." Doubtless every manufacturer of dynamo-electric machines does his utmost to attain this impossible object, and it is more than probable that they all have different methods wherewith to get the nearest approximation to the desired insulation. It would have been an easy matter for the Committee, or certain members of the Committee, to have instituted a series of experiments as to the simplest, most efficient, and most durable manner of insulating the coils on the armature or electro-magnets of such machines. It has been done by means of dipping the sections of cotton-covered copper wire in melted bitumen or paraffin wax, and in shellac varnish, but there are certain objections to all three. The coils of the French made Gramme machines, we believe, are generally steeped in bitumen, and we feel convinced that this is calculated to retain the heat developed in the bobbin when the machine is at work. When paraffin wax is employed, it melts when the sections of the armature attain a moderate temperature, and it then flies off like oil. Shellac varnish makes the cotton too hard and brittle. It was within the province of the Society of Telegraph Engineers' Committee to study these points, or to seek the necessary information from those practically engaged in constructing dynamo-electric machines. It would then have been an easy matter to decide as to which was the most desirable method to adopt for insulating section from section. The insulation of the commutator or collector slabs is also a nice point. In regard to the conducting wires there is absolutely nothing said beyond the well-known fact that they should be efficiently insulated.

How is this to be performed is the question. As we have before explained, an insulation which may appear perfectly good whenever the current used does not exceed 100 volts electromotive force, may be completely broken down when a higher tension is employed. It is absolutely necessary that for a permanency we must use something more substantial than a wire covered with several layers of tarred yarn or tape, and we must therefore fall back at present upon gutta-percha or india-rubber. It is well-known that the former preserves its insulating capacities for almost an indefinite period when under water, but if exposed to changes of wet and dry, or to a moderate heat, it soon becomes useless. India-rubber possesses considerable advantages in these respects over the former, but it is a more treacherous material to use, and a fault in it is much more difficult to find than in gutta-percha, owing to the elastic nature of the material, which partially closes up again if severed. Why did not the Committe appointed to consider these matters explain to those wanting the information the best methods of insulating wires for use under various conditions? The Society's Committee apparently makes a great point of safety plugs. We have never yet been able to understand why a fusible plug in the main circuit, which would be melted if the current attain any undue magnitude, and thus break the circuit, should be called the *very essence of safety*. There are risks inherent to this means of illumination other than that of fire, as the Committee expressly call attention to at the conclusion of the report. Why cannot such a device be abolished altogether, and an electrical safety valve—if we may use the term—be employed to divert part of the current into another channel when it becomes too great for the purposes required? Even supposing a current does attain undue magnitude, it could scarcely be a desirable thing to happen, that a mill, factory, coal mine, or private mansion, should be suddenly enveloped in darkness because a fusible plug had melted. One would hardly expect an extensive manufacturer, or user of steam boilers, to make a weak place in his steam pipes, so that they might burst if the steam exceeded a certain pressure on the square inch, even supposing they were carefully boxed up and no damage done beyond stopping the machinery. We have always advocated the frequent testing of every part of an electric light installation but we cannot agree with the Committee, that electrical testing is an operation, *skill in which is easily acquired and applied*. Men may be taught in a short time the use of recently devised instruments of a simple and portable character, but the operation would be of a purely mechanical or imitative nature, and without in the least understanding the principles involved in such tests.

The two meagre sentences devoted to lamps give us no information whatever. It is, however, suggested that "the lanterns and all parts which are to be handled should be insulated from the circuit." As the lamps constitute those parts of the circuit from which it is most likely that shocks would be experienced, we think that some hints might have been given how to practically carry out the Committee's suggestion. We have on several occasions known of accidents from this source, and in two instances a man was knocked backwards from a ladder he had mounted for the purpose of regulating a faulty lamp. We believe that mishaps of this kind, which might have turned into serious accidents, are of frequent occurrence.

There are two rules relating to "Danger to person."

We are told that it is essential that "there should never

be a difference of potential of more than 200 volts between any two points in the same room." As this regulation is to secure persons from danger inside *buildings*, we should like to know how in a large shop, illuminated, say, by means of six or eight arc lamps, the two points can be avoided where the difference of potential does not exceed 200 volts. Of course, the wires entering the room might be so far apart that it would be impossible to receive a shock from two such points, but the Committee does not mention how such a contingency is to be avoided.

The rules and regulations as they stand might form the basis or outline of an exhaustive treatise on the subject, and perhaps the Council of the Society of Telegraph Engineers and of Electricians may reconsider the subject and re-issue a pamphlet which shall recommend itself to all as an authority on this most important matter. As it stands it forms more a subject for ridicule than for serious consideration.

EXPERIMENTS WITH UNDERGROUND TELEPHONE LINES.

[In Vol. IX. of the ELECTRICAL REVIEW, and on pages 5, 148, 149, 297, 306, 316, and 338, we described fully the method of insulation for underground conductors adopted by Mr. David Brooks, and the various tests which his process had been submitted to from time to time. We believe that the officials of the British Postal Telegraph Department entertain favourable opinions on its merits. It has not yet, however, had time to fully prove its capabilities, but as far as the trials have gone on thirty wires between Waterloo and Clapham the results have been quite satisfactory. We extract from an American contemporary, the *Operator*, an article giving some details of practical telephonic experiments which have recently taken place in America, and which will be perused with interest.]

"A SERIES of tests of a subterranean telephone line was undertaken on the afternoon of July 12th in the little booth of the Western Union Telegraph Company on the dock at Communipaw, N. J. We find the following report in the New York *Times*:—

"'It is now four years since, in Philadelphia, a mile of subterranean cable was laid from a point near the old Pennsylvania Railroad depôt in the direction of Gray's dock on the river. The experiment was made under a patent obtained by Mr. David Brooks, of Philadelphia, who had just invented a new mode of insulation for telegraph or telephone wires, the main specification of which consists in the use of a fluid hydrocarbon or gas. As laid down between Newark and Jersey City, the Brooks system is very simple. The length of the pipe in which the wires are enclosed is nine and a half miles. The pipe may be of any convenient diameter, and is smoothed internally by means of a sand bath. The wires (No. 16 copper) are wound with cotton or jute and pulled through the pipe by means of a powerful capstan. The length that may be pulled through at any one time, and the largest distance between the joints, consequently, is about 3,000 feet, or a little more than half a mile. When the wires have been pulled through the pipe and the latter has been laid in place, the remaining space (not occupied by the conductors) is filled with paraffine oil, which operates as an insulator, excludes all moisture, and perfectly performs its office. On the top of Bergen Hill is a tank which contains seven barrels of oil and communicates with the pipe containing the telephone wires. The pipe from Newark to Jersey City possesses a capacity of about ten barrels. There is thus the constant pressure of the seven barrels of fifty gallons each on the pipe in which the wires are enclosed, and thus any alteration in volume occasioned by the expansion of the oil at summer heat and its contraction in winter is compensated for, and no water can possibly enter the receptacle. It costs about 10 dols. per wire per mile for a tube containing 100 wires to lay such a cable, whereas it costs no less than 50 dols. per mile to put up telegraph wires in the ordinary way.

"'The success of the experiment in Philadelphia in 1878 led to the sale of the patent to the Western Union Company for telegraph purposes at a price of 190,000 dollars, and the inventor went to Europe immediately after to introduce it there. Sections were laid in Belgium, France, and England, and were eminently successful.

"'In the meantime an attempt was made to lay a cable from Newark to Jersey City by the Western Union Company, and some five miles of wires were put down in the salt meadows, but the Jersey City and Newark authorities refused permission to disturb the streets, and the project had to be temporarily abandoned. When Mr. Brooks returned from Europe he hit upon the idea of availing himself of the right of way of the railway between Newark and Jersey City. He thus obtained access to both, and connected the Western Union offices in Newark with the station on the dock at Communipaw. The cable is not laid in the best manner, but the experiments were no less successful than if the inventor had superintended every rod of the work. The material used for insulation is the second distillation of petroleum, or rather the residue that is left—a thick, heavy oil, good for lubricating purposes—after the burning fluid has been distilled off. This residue contains traces of soda and sulphuric acid, which would corrode the wires if left in the oil; and this fact renders a second distillation necessary, which slightly increases the cost per gallon. In the experiments yesterday afternoon the two points it was proposed to determine were the amount of interference by induction and the general practicability of the system. It is a familiar fact to the reader that when he puts his ear to the loud receiver of the telephone to listen to a person at the other end, voices not intended for his benefit, and really passing on other wires, are passed over to the conductor that he is using. This faint electrical reverberation is styled induction, and how to get rid of it has been one of the problems of telephone engineering. There is also a frying sound that is due to induction, and there are other difficulties that are familiar only to experts. Combined together, these difficulties have hitherto materially interfered with transmission at long distances, and it was claimed that they could not be overcome if subterranean wires were used.

"'The experiments yesterday were witnessed by a few persons only, among whom were Mr. Vail and Mr. Jaques, manager and electrician of the Bell Telephone Company, of Boston; Mr. J. W. Dyer, a Philadelphian electrician of high repute; Mr. Chinnock, electrician of the Metropolitan Company of this city, and Mr. Davis, its president; Mr. Robinson, of Philadelphia; Mr. Brooks, the inventor, who took no material part in the tests, and a few other gentlemen. In order that experts of the best skill might be at both ends of the cable, Mr. Chinnock went to Newark and operated the Newark end, while Mr. Dyer and Mr. Jaques operated the instruments at Communipaw. The wires had been connected until a circuit of 150 miles in length was established, and this was first tested.

"'There were some embarrassing circumstances, one of them being the fact that the Western Union system, using a dynamo equal to 185 volts at this end and a 60-cell Calland battery at the other, was in constant operation, parallel with the telephone wires. The first test was made with grounded wires, Mr. Dyer talking with the operative at the Newark end while Mr. Jaques listened for induction interference. The voice of Mr. Chinnock could be faintly heard as a result of induction, but Mr. Jaques pronounced it not sufficient to interfere with the practical working of lines. One wire after another was thus tested, with substantially the same result, both with the wires grounded and not grounded, in order to measure the induction as a separate factor. The next experiment was to connect several series of wires into metallic circuits, and to institute the same series of tests as to induction. No. 1 and No. 2 were first employed in this manner, and there was absolutely no sound brought to the ear by the second receiver. When No. 9 and No. 10 were similarly connected and the tests were applied the voice at the other end was heard in a faint, far-off manner, and only an occasional word could be distinguished. The same was the case with a circuit composed of No. 23 and No. 24. The experiments occupied the whole afternoon.'"

DIVISION AND SUBDIVISION OF THE ELECTRIC CURRENT.

In our "Notes" will be found a letter from the pen of Mr. John Banting Rogers, who claims to be the inventor of the *division* and *subdivision* of the electric current. As long as Mr. Rogers was privately engaged with his work we refrained from setting aside any portion of our columns, to show the evident want of the merest elementary knowledge of electrical matters displayed in the fantastic creations of his brain. The subject has recently, however, assumed a public form, a J. B. Rogers Company having been promoted and the name of a well-known expert, who had reported on the system, dragged into the controversy now going on in the daily press in a manner not particularly creditable to either party; and we therefore feel compelled to comment on this subject in such a way as to bring it to a close once and for all, if possible, as far as we are concerned. We cannot, however, be so severe upon the originator of these so-called inventions as upon those who have so strenuously encouraged him in his erroneous ideas. Certain of our contemporaries have probably done more to keep the name of Mr. Rogers before the public than even a portion of the daily press; and these should really be held responsible for any injury which either Mr. Rogers, or those associated with him, may have sustained. We will, in the first place, allude to the claim set up by Mr. Rogers and others on his behalf, as to his being the first inventor of the division and subdivision of the electric current. We have before remarked, when speaking of the Company promoted for working the J. B. Rogers inventions, that a claim for the division and subdivision of the electric current could not be sustained, as in all electrical work the current may be made to flow in one or many directions, as the circumstances require. We will, however, bring before the notice of Mr. Rogers one particular patent (Werdermann. Apparatus for Electric lighting, dated 21st June, 1878) in order that he may know what had been done in incandescent or semi-incandescent lighting prior to the 20th September, 1880, the date of his first electrical invention.

The third claim of Mr. Werdermann reads as follows:—

"The apparatus or arrangements comprising the series of parallel circuits in connection with my improved lamps or other suitable lighting devices with or without artificial or special resistances, in the manner illustrated and described in connection with figs. 13 and 14 of the drawings, whereby I am enabled to effect the division of the electric current to produce any desired number of lights in connection with one battery, or other source of electricity, in such a manner that each one of such lights may be regulated, or extinguished, without affecting any, or either, of the other lights," &c., &c.

Leaving this for the moment we will return to the specification of J. B. Rogers, which is set forth in the following words:—

"The object of this invention is improved means and apparatus for dividing and subdividing the electric current for lighting or other purposes, by means of pairs of spherical, conical, hemi-spherical, bell, or flat, square, or other suitable shaped metallic bodies, to one portion of which are clips or other appliances for the attachment of the primary wires from a dynamo machine or other electric force producer, and with a series of other clips or appliances on the bands,

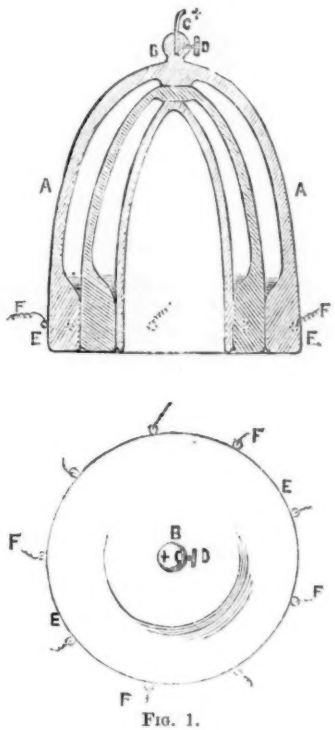

Fig. 1.

bases, or edges of the metallic bodies, to which othe wires can be connected for conducting the fluid to any desired number of lamps or carbons, or to other shaped vessels or metallic bodies arranged in pairs, from which again wires can be conducted to other lamps or carbons. The apex of the bell or other shaped vessels or cups, if of bell shape, is preferably of greater thickness than the body for *accumulating and governing the fluid* (the italics are ours). The bands are also of greater thickness than the body for a similar purpose.

"Should the vessel have a spherical or globular form, the clips above referred to may be fixed upon a central band or belt; and instead of the single clips being on the apex it may be fixed to the collar or stem on which the globe stands.

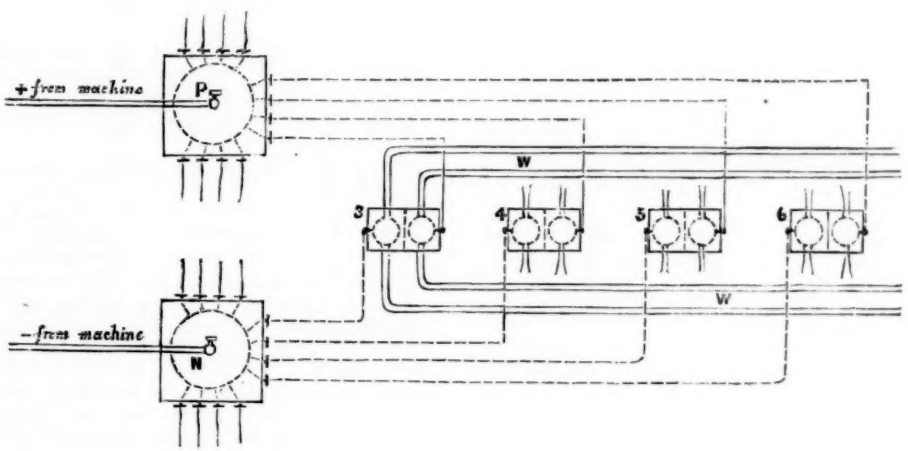

Fig. 2.

"For intensifying light, the series of clips on the bands of the vessels may have the primary wires of electric force producers, or of several of them, attached to them so that the united fluids may be transmitted through the apex wire of the bell-shaped vessel, or through the collar wire of the spherical vessel to one or more lamps or carbons.

"Any number of my metallic bodies may be used between the force producer and the light or lights if desired, for intensifying on the one hand, or dividing on the other."

The specification sets forth in the usual manner that the invention will be clearly understood by the accompanying drawings, and as we consider fig. 1 the most comical of any we reproduce it in plan and section.

We extract from the specification the explanation of these devices :—

"Fig. 1 is a section and plan of a bell-shaped apparatus, A, with lining vessels in the interior for current intensifying and distributing purposes ; B is the apex, with a conducting wire, C, attached by the screw clip, D, and E is the band or base around which a series of other conducting wires, F, are looped, or they may be attached in any other convenient manner, said wires, F, F, leading to and connected with electric lamps for producing light from one main dynamic or other force producer, as before mentioned, or for distribution of current for other purposes."

It is specially stated with reference to the drawings that "the above described figures only indicate a few of the devices which I intend to adopt for the purposes of my invention—viz., an apparatus for gathering or accumulating the electric force or fluid given off, or from, a dynamo-electric or other current producer, and by, in, or through said apparatus, so dividing or subdividing the current that several lamps or lighting appliances or apparatus in or by which the electric light can be established is effected, or its distribution for other purposes."

The specification is adorned with a second sheet of drawings, mainly consisting of a diagram showing these marvellous boxes connected up for use. We extract a portion of the sketch, which we prefer to have explained in the inventor's words :—

"Fig. 2 is a diagram of my system of subdividing and distributing the current ; P, N, are a pair of primary apparatus with twelve subsidiary wires each, positive from one and negative from the other. Each pair of branch wires from the primary apparatus is led and attached by any of the usual connection appliances to smaller apparatus, 3, 4, 5, 6, in which the current is gathered or accumulated, and passes by the subsidiary wires, W, W, of these smaller apparatus to other but still smaller apparatus from which are other subsidiary wires to lead the current for its intended use, or to other and smaller apparatus for a further distribution of the same, this system being carried on to any desired extent."

The inventor claims—

"1st. The system or means for gathering or collecting electric current into intermediate vehicles arranged in pairs, and in distributing said current therefrom by subsidiary conducting wires, as described, especially for lighting purposes, as set forth.

"2nd. The several apparatus shown on sheet 1 of the annexed drawings, and their employment in pairs as vehicles for the division and subdivision of the electric current, substantially as on sheet 2 of the annexed drawings, for the purpose or purposes set forth."

So much for this so-called patent which has had the support of two or three leading daily papers, and several of our scientific contemporaries, amongst them one dealing exclusively with electric lighting matters. Perhaps they might, if according any further notice to the matter, explain the difference between the circuit connections of Mr. Rogers and those adopted by Edison, Swan, and others. There is certainly a difference, in so far that in the one case the wires constituting the mains, submains, &c., are properly connected to each other where required, and in the other an extra piece of metal is put in circuit to increase the chances of bad joints or disconnections.

We must ask the pardon of our scientific readers for bringing forward the "*multiple terminal*" arrangement of Mr. J. Banting Rogers, and when we state our reasons for so doing we feel sure of their tolerance. The present year has been unprecedented in the introduction of the subject of electric lighting amongst all classes, and we are well aware that journals in which reliable information can be obtained relating to the various systems brought forward are now extensively perused by the general reader or public ; and it is therefore in the interests of the latter that we have lent our columns to the consideration of that which would long since have sunk into oblivion had it not been for the causes we have already alluded to. Mr. Rogers may believe, and probably does, that he is the victim of prejudice, but in this he is entirely mistaken. Years before 1880 everything that appears in his specification was known and in use for innumerable purposes connected with electrical science. Mr. Rogers invites the public to come and see how far he has succeeded in lighting by electricity the cottage or the mansion, and in this invitation he is perfectly safe ; for if the public were competent to judge these things, Mr. Rogers and his system of division and subdivision would have been vetoed long since. If Mr. Rogers lives long enough he will perhaps eventually come to the conclusion that the opinion of scientists and demonstrated facts are very much alike, when the laws governing any branch of science are as well known as those of electricity. We trust that this matter will now gradually be forgotten, and should Mr. Rogers in the future devise anything relating to electrical science worthy of favourable mention, we shall be amongst the first to welcome it.

Doubtless he has worked energetically for a long period in the belief that he had achieved some decided step in advance of the present methods of utilising the electric current for the purposes of illuminating our streets and houses. It would have been well had the ridicule which he well knew his work provoked in certain quarters led him to reflect for a moment that he might possibly be making an error ; and then, had he been sufficiently wise to consult some electrician of known reputation, he might have been saved much trouble and annoyance, and we should have been spared the mental energy wasted in perusing his patent.

OBITUARY.

ANTOINE BREGUET.

WE reserved our notice of the death of this gifted young scientist until we were able to place more information before our readers than has been possible hitherto. We are indebted to our French contemporary, the *Revue Scientifique*, for the long article we publish. We have it on good authority, however, that this Journal, with which M. Breguet was for long associated, credits him with more than he actually achieved, notably in the statements relating to perfecting the Gramme machines and the telephone of Bell. Be this as it may, electrical science has lost in Antoine Breguet one who could ill be spared.

He was descended from a Protestant family, who at the time of the Revocation of the Edict of Nantes sacrificed their interests to their religious opinions and took refuge in Switzerland. His great-grandfather, Abraham Breguet, came back to France at the time of the Revolution and established himself at Paris as a clockmaker. His important discoveries placed his reputation on a firm footing, and he was made a member of the Academy of Sciences. His grandfather, Antoine Breguet, also distinguished himself in his art. His father, M. Louis Breguet, the well known scientist, the inventor of a telegraph which has been in use thirty years, is at present a member of the Institut. It has been his sad lot to survive his son, on whom he looked as the hope and support of an honoured name.

Antoine Breguet was born at Paris, January 26, 1851. He pursued a brilliant course of studies at the Lycées Saint Louis and Bonaparte ; but a violent attack of rheumatism overtook him in 1870, at the age of 19, and seriously affected his health, leaving behind the germs of heart disease. This malady, as Antoine Breguet well knew, demands a life of calmness and tranquility, free from cares and fatigue. But he had a very keen sense of the responsibility imposed by an illustrious name, and also a laudable ambition to add to the fame bequeathed to him by three generations. Led on by this idea, and sustained besides by his high moral energy,

he gave himself up assiduously to work, without either relaxation or rest. He had a motto, which we have often heard repeated in joke: *Noblesse oblige;* and this is the explanation and the history of his life.

Scarcely recovered from his illness, he enlisted at the time of the war, although at his age he was not called upon to do so, and took part in the defence of Paris as lieutenant of the auxiliary corps.

After the war he resumed his duties and prepared himself for the Ecole Polytechnique, where he was received in 1872. On leaving the Ecole in 1874 he refused the public offices to which his rank gave him a right, and entered, as submanager, the factories built by his father for the construction of instruments for exact measurements and electrical apparatus.

At that time new and important applications of electricity were springing up on every side. The Gramme machine, the improved telegraphs, and the telephone, made their appearance successively. Antoine Breguet was one of the most ardent promoters of the new discoveries. He was one of the first to understand what an immense future electricity had before it, and he devoted himself to the study of this science in particular, without neglecting the administration and general direction of his firm. He himself directed, in his factories, the first attempts at constructing the new models presented by inventors; and thus on several occasions important improvements suggested themselves to him.

Although the management of the factories was a difficult and absorbing task, Antoine Breguet contrived to devote a great part of his time to purely scientific studies. He attended the lectures of M. Mascart, at the College of France, and by reading the original papers he completely mastered the new theories, then little known, of the great English electricians, Faraday, Clerk-Maxwell, and Sir William Thomson. For Faraday, in particular, he expressed the greatest admiration, and to that illustrious physicist, whose profound researches into the nature of electrical phenomena impressed him deeply, he traced all the progress made in electricity during the last fifty years.

But soon, by his own personal efforts, he became known to the public as an inventor and *savant* of great merit.

We may mention an ingenious anemometer, invented by him in 1875 and moved by electricity, which registers, at a distance, and continuously, the speed of the wind. One of these instruments is at work at the Jardin d'Acclimatation.

In February, 1878, he addressed a note to the Académie des Sciences on the "Telephone and the String Telephones."

He had discovered the curious fact that every point of the telephone (magnetised bar, handle, &c.), or of a substance connected with it, vibrates at the same time as the plate of soft iron, and may serve to transmit sounds.

He verified this most elegantly by means of a simple toy called the string telephone. If, in fact, the extremity of a string telephone is fixed to any point whatever of the Bell apparatus, the sound is plainly heard at the other extremity. From this he showed a means of communicating to several persons at once, the sounds arriving at one single telephone. All that is required is a few string telephones connected to any points whatever of the Bell apparatus. The string of the telephone may, besides, by certain special arrangements indicated in the note, pass through comparatively great distances.

The same year he invented a telephone called a mercury telephone, which is essentially different from all those known before, and seems still more surprising than Bell's. The complete description of it is to be found in the *Comptes Rendus* of the Académie des Sciences (March, 1878). The receiver and transmitter of this telephone are identical, and consist of two very simple Lippmann electrometers, furnished with a membrane at the upper part of the tube. The vibrations of the membrane of the transmitter are communicated to the mercury or to the glass and produce variations of current, which the wire of the line transmits to the other station. The electrometer being reversible, the membrane of the receiver undergoes exactly the displacements of the transmitter.

This telephone does not necessitate the employment of a battery, like the Bell telephone. It offers the following advantages over the latter:—

It transmits any vibrations whatever.

It is independent of the resistance of the line.

This last property allows of substituting for the thick wires of the ordinary lines fine steel wires of small diameter, thus effecting a considerable saving of expense. He thought that this discovery would be turned to account in the ordinary telegraph, and that electro-capillary phenomena would be utilised for the transmission of force to a distance. He had the intention of making researches into this question; but, alas! he had no time. Shortly after he published in the *Annales de Physique et de Chimie* a very important article entitled "Researches into the Theory of the Gramme Machine, the Cause of the Unsymmetrical Position of the Brushes, and an incidental Study of Magnetic Screens." The outline of this article was presented to the Academy, November 11th, 1878.

The Gramme machine, which has been known for several years and is familiar to the *savants* of every country, still presented certain difficulties. To Antoine Breguet must be conceded the merit of being the first to give an exact and complete theory on the subject.

In this article he dwells first on the reversibility of the machine, and shows simply that it is derived from well-known instruments—the revolving disc of Faraday and Barlow's wheel. But these latter furnish a very weak current, and inventors have tried, by the addition of an inner ring of soft iron, or by a special method of coiling the wire, to realise, with small volume, a machine of great power. He examines the methods given by Frölich and Alteneck; and indicates a new and far preferable mode of coiling. He then shows the exact function of the ring in the different machines. It is useful in all, for it heightens the intensity of the magnetic field; but in the Gramme machine it is indispensable, and acts as a magnetic screen to protect the inner spirals of the coils.

He then analyses the causes of the unsymmetrical position given to the brushes. This anomaly had always been attributed to the retardation of the *demagnetisation of the ring of soft iron*. But the coercive force of the ring is, really, the least important cause. He shows, in fact—and this is the most original part of his discovery—that the deviation is chiefly due to the reactions which take place between the magnetic fields of the exciting magnets and of the current of the coils. He then gives, from the results of his experiments, the simple rules which enable one to determine, in every case, the most advantageous position to give to the brushes.

In this long paper he turns to the greatest account Faraday's lines of force, of which he had made a special study. He calls attention at the commencement to their principal properties, and in the course of the paper he states two new laws, which may be added to the two laid down by Faraday. They deserve to be quoted verbatim: *The density of the lines of force at a certain point is proportionate to the greatness of the force at that point. A line of force contained in a magnetic substance is magnetically shorter than that contained in a diamagnetic substance, or more generally in a substance less magnetic than the first.*

In a conference held at the Sorbonne in 1880 he gave the result of his researches on the lines of force, and showed the wonderful benefit to be derived from them. By their means he showed from the commencement the close analogies between electricity and magnetism, and easily recognised their principal properties. He explained simply the magnetic screens, the attraction of the soft iron, and the orientation of the diamagnetic substances. Besides, this theory of the lines of force enabled him to state that the metallic rings in motion cease to be magnetic screens, and the subsequent experiments of M. Lippmann confirmed this assertion. Thus he thought that the study of the lines of force, on account of its simplicity and its utility, would one day form a part of the rudimentary instruction in electricity.

From 1875 to 1880 he published several articles on fresh discoveries in different journals and reviews (*Bulletin de l'Association scientifique, Revue des Deux Mondes, Annales de Chimie et de Physique*). He held several excellent conferences on the same subjects at the Scientific Association of France, at the Sorbonne, at M. Würtz's laboratory, at the Ecole de Médicine.

In 1880 he undertook the editing of the *Revue Scientifique*, in conjunction with M. Charles Richet. He contributed an important share of the articles of every kind published

in this journal. He inserted in the *Revue* the first article published in a French journal on Graham Bell's remarkable discovery of the photophone. When the famous Bell arrived in France, A. Breguet installed in his factories the series of photophonic instruments, and invited various scientific men to witness the very interesting experiments of demonstration. Graham Bell, who was able to judge of Breguet by this circumstance, entertained the greatest friendship for him.

In 1881, A. Breguet was made the head of the service of installations of the electrical exhibition. Quite a young man, he had for five years been the manager of a great firm, and he had acquired the experience of middle age; he was well acquainted with all the scientific and industrial questions relating to electricity; he possessed besides a quality rarely found in a scientific man—the great art of judging men, and the habit of quickly seizing the main points of a question as well as its details. Add to this his invaluable natural qualities, his coolness, his unflagging gaiety and high spirits, and his marvellous tact. During the whole course of the electrical exhibition he rendered the greatest services to this truly national enterprise. He first conceived the happy idea of establishing telephonic communication between the Palais de l'Industrie and the theatres.

His work was not, however, limited to directing the installation of the exhibits. His scientific knowledge caused him to be called upon to take part in the important meetings of electricians held during the exhibition. He was also delegated by the administration to the International Congress of Electricians. At the end of the Exhibition he obtained the Cross of the Legion of Honour.

During this exhibition he had been convinced more than any one that the applications of electricity had a grand future before them. Capital was soon at his disposal, and he founded an important industrial society, of which he undertook the direction.

At this time his prosperity seemed unclouded. At the age of 30 he was known as a scientific man; he was the equal and friend of great scientific notabilities; he was at the head of a prosperous industry. And, besides, in his private life he enjoyed all the pleasures of home. Married to a wife whom he loved, and father of three children, fortune seemed to smile upon him on every side. But the malady which had checked him at the commencement of his career had insensibly made rapid progress. The excess of work during the exhibition had caused general fatigue. He disregarded these warnings, and the fears manifested by his family and his doctor. His moral energy, in fact, the predominant feature in his character, was as strong as ever, and his confidence in himself and his future had even increased. He knew no better than before how to spare himself work. The directing of his firm, the construction of new workshops, the editing of the *Revue*, absorbed his day; the evening he devoted to the preparation of a course of lectures to be given for the first time, at the Observatoire, to the naval officers at Paris. This course was instituted by Admiral Mouchez for the purpose of instructing naval officers in the principal recent discoveries in the domain of electricity.

All these hopes, all these joys, were brought abruptly to an end. The body, worn out by work, became weaker and weaker. In May he was obliged to keep to his room and give up all intellectual efforts. However, his courage and his hope of a speedy cure had not left him, when he died suddenly on the 8th of July.

His death is a cruel loss to his country, to science and to industry.

But his relations, his friends, his workmen, who stood in crowds round his tomb, were at least able to speak of him in these words: "*Antoine Breguet, dead on the field of honour.*"

Glasgow Science Lectures.—Arrangements have just been completed for the delivery of a course of science lectures at Glasgow during the coming winter. On the list of lecturers we observe the name of Prof. Silvanus P. Thompson, who is to discourse "On the Earth as a great Magnet."

CORRESPONDENCE.

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Correspondence should arrive not later than Tuesday morning if it is desired to appear in the following number.

THE TELEPHONE.

To the Editors of The Electrical Review.

Dear Sirs,—I am glad that the pieces of evidence which I have been able to adduce from the original writings of Reis have drawn from Count du Moncel the promise to insert them in the next edition of his book, "Le Téléphone." I must, however, express my surprise that the author of a historic work on the telephone, such as Count du Moncel's claims to be, should have so long done the original inventor of the electric telephone, which "formed the starting-point of all the others," the injustice of not acquainting himself with the *ipsissima verba* of that remarkable man. Compared with the stuff that has been written from time to time about Reis's telephone, the original memoirs of Reis are as clear as daylight. Nor do I think that even Count du Moncel will long be able to withhold from Philipp Reis the honour of having been the first—whether he understood the *theory* of it or not—to transmit articulate speech electrically.

I do not know that it is necessary for me to prove that Reis understood the principle of undulatory currents in order to believe that his telephone would and did transmit speech. I believe that M. Gramme, who invented a very admirable dynamo-electric machine, did not understand the equations of mutual induction, and yet I do not doubt that his machine generates electric currents. But in the case of Reis the diagrams of curves attached to his memoirs conclusively show that he did realise what was to be done, though he only succeeded in finding an imperfect means of attaining it.

Count du Moncel throws down a challenge of fact, which I shall be most happy to accept. He says, and italicises the words himself, that "for sounds to be reproduced by a receiver, consisting of *an iron wire enclosed in a helix, and stretched on a sounding case placed on a table* (the only Reis receiver known), the currents sent by his transmitter must have been *interrupted*." . . . Why must they? This form of receiver—commonly known as Reis's knitting-needle receiver—will articulate just as well, though not so loudly, as a Bell receiver, if supplied with adequate currents. If Count du Moncel will try the experiment with two or three bichromate cells and a good transmitter, such as Hunnings' or Ader's microphone, he will have a sufficient proof that Reis's receiver *will receive* articulate speech. When Count du Moncel says that with this receiver the currents "*must*" have been interrupted, I simply deny this to be the fact, and reply that if this receiver is to articulate the current *must not* be "interrupted," in the sense of being completely broken.

I am surprised that Count du Moncel does not know of the existence of the other Reis receiver with the electro-magnet in it. My earliest acquaintance with it was in Kuhn's "Angewandte Elektricitätslehre" (p. 1018) in Karsten's well-known cyclopædia, published in 1866. The original description of it is in Legat's report in the "Zeitschrift" of the Austro-German Telegraph Union of 1862. Perhaps Count du Moncel only knows it as Legat's receiver, as I myself for a long time thought it, until I read the original article and found it to be really Reis's.

Again, Count du Moncel says that if Reis had really penetrated the principle of the articulating telephone he could have substituted for the metallic contacts some of moderate conductivity. *Why should he*, indeed? This fallacy—that a semi-conductor is advantageous, first introduced by Edison—has nothing to do with the matter. Take an ordinary Blake transmitter and replace the carbon button by a silver sixpence. It articulates just as well as before. Yet silver is the very *best* conductor. Conductivity, or semi-conductivity, has nothing to do with the matter, and the only advantages of carbon over silver are that it does not fuse or rust at the point of contact; and that, moreover, at the point of contact a minute voltaic arc *may*, in certain cases, prevent complete interruption in the circuit.

Reis did, indeed, penetrate the principle of the articulating telephone: for, as in every practical telephone transmitter in use to-day, so in his telephone transmitter, there was a *loose contact* in the circuit, *so arranged that the voice could act upon it, and thereby regulate the strength of the current*. If you eliminate this part of the apparatus—screw up the loose contacts of your practical telephone transmitters so that our voices cannot affect them—what will your telephones be worth? No, the essential principle of the telephone is *imperfect contact*, and that essential principle was invented and applied for the purpose of transmitting speech by Philipp Reis in 1863.

If this does not suffice as a claim for the invention of the telephone transmitter, I wonder what will. We can dispense with the electro-magnetic receiver, and use other receivers; we can dispense with diaphragms, and tympanums (also Reis's invention, by the way), in the transmitter; we can dispense with semi-conductors, *et id genus omne;* we can dispense with springs and tension-screws: but with the principle of *loose contact* we cannot dispense. That which alone is indispensable, Philipp Reis discovered.

SILVANUS P. THOMPSON.

July 26th, 1882.

THE CITY AND GUILDS OF LONDON INSTITUTE TECHNOLOGICAL EXAMINATIONS, 1882.

To the Editors of THE ELECTRICAL REVIEW.

SIRS,—The students who sat at the technological examinations held under the auspices of the City and Guilds of London Institute in May last are now aware of their examiners' decisions. These decisions, so far as they relate to electrical engineering, may perhaps, when summarised, not be uninteresting to your readers:—

TELEGRAPHY.

Town.	Passes, 1882. Grade.				Students Examined.				Total Students Examined.		Remarks.
	Honours		Ordinary.		Connected with Industry.		Unconnected with Industry.				
	1st Cl.	2nd Cl.	1st Cl.	2nd Cl.	Passed.	Failed.	Passed.	Failed.	1882.	1881.	
Belfast	...	1									
Bolton	...	1									
Edinburgh	...	2	...	3							
Falmouth	...	1	...	3							
Glasgow	1	...	2	2	...	...	...	...	...	...	5th prize O.G.
Hebden Bridge	...	...	1								
Huddersfield	1										
Leeds	...	1									
London	1	...	...	7	...	...	...	...	...	...	1st prize H.G.
Manchester	1	...	1	3	...	...	...	...	...	...	2nd prize H.G. & 2nd prize O.G.
Nottingham	...	1	2	...	...	...	...	...	...	...	1st prize O.G.
Oldham	...	...	...	1							
Plymouth	...	...	1	...	...	...	...	...	...	...	3rd prize O.G.
Salford	...	1	1	...	...	...	...	...	...	...	4th prize O.G.
Sheffield	...	...	...	1							
Southborough	...	...	...	1							
W. Hartlepool	...	...	...	2							

ELECTRIC LIGHTING, &c.

Town.	Passes, 1882. Grade.				Students Examined.				Total Students Examined.		Remarks.
	Honours		Ordinary.		Connected with Industry.		Unconnected with Industry.				
	1st Cl.	2nd Cl.	1st Cl.	2nd Cl.	Passed.	Failed.	Passed.	Failed.	1882.	1881.	
Glasgow	...	...	3	13	...	...	...	..	...	...	3rd prize O.G.
Leeds	2	...	2	2	...	...	...	...	...	...	2nd prize H.G. & 1st prize O.G.
London	1	1	2	...	...	...	...	...	...	...	1st prize H.G. 2nd prize O.G.
Plymouth	...	...	...	1							

ELECTRICAL INSTRUMENT MAKING.

Town.	Passes, 1882. Grade.				Students Examined.				Total Students Examined.		Remarks.
	Honours		Ordinary.		Connected with Industry.		Unconnected with Industry.				
	1st Cl.	2nd Cl.	1st Cl.	2nd Cl.	Passed.	Failed.	Passed.	Failed.	1882.	1881.	
London	1										

My chief object, however, in submitting the above schedules to you is to suggest, through the medium of your valuable paper, the desirability of the Institute giving in the annual report the information requisite for the filling up of the blank columns, and thereby rendering the schedules both interesting and instructive.

It is satisfactory, no doubt, to know that 43 students have passed in telegraphy, 27 in electric lighting, &c., and 1 in electrical instrument making; but it would be much more satisfying to know how many candidates attended the examinations, and how many of them were connected with the industry examined on. I feel assured that the utility of such statements would more than repay the little extra labour incurred in their compilation.

It is, perhaps, somewhat early to comment on the results of the examinations with the meagre details at present in our possession, but it may be pointed out that the only two ladies whose names appear on the *Pass List* are connected with telegraphy. This is a gratifying feature, and it is to be hoped that on the next list, not only will these names re-appear, but those of many other fair competitors. The laurels gained for London are a little remarkable. The student examined at Cowper Street takes the place of honour, while the seven students examined at the Central Telegraph station take second-class places in the lowest grade! This is, unfortunately, not an exceptional case, and when taken in connection with the remark in the examiners' last report, that he knew the papers of those engaged in telegraphy, will, it is to be feared, produce a most detrimental effect, so far as telegraphists are concerned, and it can hardly create surprise if the falling off in next year's *Pass List* is even greater than that in the one just issued.

Colonel Webber, in his inaugural address to the Society of Telegraph Engineers, speaking of telegraph engineering, says:—"So blind is the tyro to the realities of practice and to the intricacies of the agent he uses that technically educated men, thrown into the turmoil of the insidious difficulties to be encountered, will break down, and fail even to detect them. In an educational institution such as I have before my mind, I would, if possible, not only allow the *theory* and *practice* to march hand in hand, but I would allow the practice to precede the theory with some minds, and *vice versâ*. The course would thus engage the interest of both kinds of minds, and confer the maximum of benefit. Such an institution should include instruction in the lecture theatre, in the workshop, in the laboratory, &c." This is undoubtedly what should be; but is the consummation likely to be attained so long as the present system of examination prevails? Will students who are more ambitious to win prizes than gain genuine knowledge, and teachers who are more anxious to increase their incomes than impart lasting instruction, give to *practice* the attention which it deserves? No; because payment and rewards are now made not according to useful knowledge, but according to cram, or examinational knowledge; and until steps are taken to make practical examinations go hand in hand with the written examinations this unsatisfactory state of affairs must continue, and such cases as the following, by no means an isolated one, recur.

A student who some five years ago obtained from the Science and Art Department a first class certificate for electricity and magnetism, and who has since devoted the greater portion of his time to the study of technical telegraphy, and discharges from time to time the duties of a testing officer, attended, along with a fellow clerk, whose studies dated from

the close of the preceding year, a recent technological examination, with the result that while the man of six months' study gained an honour's place, the man of six years' theoretical knowledge and practical experience was plucked. For this anomaly the examiner is in no way responsible, his duty being to adjudge the papers submitted to him without partiality; and I bring it forward not to point to any unfairness on his part, but to draw attention to the necessity for practical examinations, for there can be but one explanation of the failure of the man who is familiar with the laws of electricity and who applies them daily in the discharge of his duties, and that explanation is his inability to express himself on paper with such clearness as to warrant his examiner in granting him a place on the Pass List.

As the subject is one of considerable interest I leave it to be discussed by those better qualified than

Yours truly,

July 28th, 1882. FAREHAM.

ELECTRIC LIGHTING IN THE CITY.

To the Editors of THE ELECTRICAL REVIEW.

DEAR SIRS,—With reference to the notices which have recently appeared in your journal, giving certain figures as to the electric lighting in the City, I beg to state that these statistics, as given, may be very misleading without explanation, as they do not by any means convey to the general reader a fair understanding of the subject. The apparent high percentage of so-called "failures or extinctions" shown as to the Brush light is almost wholly due to the fact that the lighting was discontinued from the 2nd May, 1881, for a period of seventeen days, it having been determined, in consequence of defects which soon appeared in the first cable laid down, to replace it with another. This, surely, should only be estimated as a single failure (one, too, which had nothing to do with the Brush system, and which could be guarded against for the future); whereas it is reckoned, in the figures given in your article, as 561 failures, counting each of the 33 unlighted lamps as one failure for each of the 17 nights during which no lighting was even attempted. This reduces the reported 660 failures to exactly 100, the whole of which arose from causes which (after the experience gained in this the first large attempt ever made at street lighting in this country) are easily remediable. It is worthy, also, of notice that, although the lamps in question are all on a single circuit, in no case has an accidental stoppage of the mechanism in one lamp affected any of the others. The 209 hours 30 minutes extinction, through the failure of the driving apparatus, occurred at the commencement of the trial, when some necessary alterations were being made in the arrangement of the boilers and other machinery at the factory.

It should further be pointed out that the number of so-called failures was considerably increased by one of the lamp-posts being overthrown by a van, causing an extinction of this lamp for 103 hours. Deducting, then, from the gross extinction of 3,142 hours 30 minutes, 2,630 hours for relaying the cable, 103 hours for the broken lamp-post, and 209 hours for the alterations to boilers, &c., which events are altogether outside any defect in the Brush system of electric lighting, there remains only 200 hours of extinction, spread over a series of 33 lamps, out of the total number of 141,900 lighting hours, being a percentage of ·14 during the whole year of an experimental running, the first of its kind ever attempted in this country. I would further point out that of these defects the bulk were in the early part of the experiment, and that they have gradually become less and less, pointing to the conclusion that with a little more time and experience we may expect that they will disappear entirely.

Since the continuation of the lighting for the second year the lamps have burnt very regularly, and, so far, we have had no complaints.

I would mention that the subject is very fairly and comprehensively dealt with in the report of the Streets' Committee, presented by Colonel Haywood, a copy of which appeared in *Engineering* of July 14.

Yours faithfully,

JAMES HUMPHREYS.

London, *Aug. 3rd*, 1882.

[We take pleasure in inserting Mr. Humphreys' interesting letter. He has, however, apparently overlooked the source from whence we derived our figures, viz.: the report to the Streets Committee, to which he alludes in his letter. Mr. Humphreys seems not to have read the article in our contemporary carefully, or he would notice that the analysis of the failures is not from the pen of Mr. Haywood. We cordially agree with our correspondent that with more time and experience defects which now exist should disappear entirely.—EDS. ELEC. REV.]

NOTES.

CRYSTAL PALACE INTERNATIONAL ELECTRIC EXHIBITION, 1882.—The directors have pleasure in announcing that they have received from the jurors the following award of prizes:—

DIPLOMAS OF HONOUR.

AWARDED TO EXHIBITORS NOT COMPETING FOR TRADE MOTIVES.

Her Majesty's Postmaster-General.
The Secretary for War.
The Anglo-American Telegraph Co.
The Eastern Telegraph Co.
The Telegraph Construction and Maintenance Co.
The Submarine Telegraph Co.
The South-Eastern Railway.
The London, Brighton, and South-Coast Railway.

For the general excellence of their exhibits.

C. F. Varley.—For his induction machine and condensers.
R. H. Froude.—For dynamometer.

GOLD MEDALS.

J. R. Voss.—For induction machine.
Elkington & Co.—For their deposition of gold alloys and general excellence.
H. Wiggin & Co.—Improvements in electro deposition of nickel and cobalt.
The Faure Electric Accumulator Co.—For Faure battery.
T. A. Edison.—For complete system of lighting and other exhibits.
British Electric Light Co.—For Gramme dynamo machine and exhibit.
R. E. Crompton.—For Bürgin dynamo machine and Crompton arc lamp.
Anglo-American Brush Co.—For Brush dynamo machine and arc lamp.
Swan's Electric Light Co.—For incandescent lamp.
Electric Light and Power Generator Co.—For Weston and Maxim dynamo machines and lamps.
White House Mills.—For dynamo machine.
Rowatt and Fyfe.—For Pilsen arc and Joel semi-incandescent lamps.
G. G. André.—For arc lamp and regulator.
Gérard & Co.—For arc lamp.
Davey, Paxman & Co.—For steam engines.
Galloway & Sons.—For steam engines.
Marshall & Co.—For steam engines.
Robey & Co.—For steam engines.
Ransomes, Head, and Jefferies.—For steam engines.
Hornsby and Sons.—For steam engines.
E. S. Hindley.—For steam engines.
Crossley Brothers.—For Otto gas engine.
Thomson, Sterne, & Co.—For Clerk's gas engine.
Roos and Ostrogovich.—For their application of the automatic system to Hughes' type printing apparatus.
Johnson and Phillips.—For the general excellence of their exhibits.
Direct United States Cable Co.—For the excellence of their exhibits.
Edward B. Bright.—For his fire alarm system.
The Exchange Telegraph Co.—For the general excellence of their exhibits.
Professor Dolbear.—For his new electrostatic telephone.

SILVER MEDALS.

Coxeter & Sons.—Class X.
W. Elmore.—Class XI.
United Asbestos Co.—Class XIII.
J. & H. Gwynne.—For steam engines.
Fyfe & Main.—For arc lamp.
National Electric Light Co.—For dynamo machine and lamps.
Gravier & Co.—For arc lamp and exhibit.
R. Hodson.—For steam engines.
Hammond Electric Light Co.—For installation of Brush machines and lamps.
A. Cance.—For arc lamp.
Domestic Electric Lighting Co.—For the general exhibit.
Electric Lighting Supply Co.
Electric Lighting Engineering Co.
Strode & Co.
W. Ladd & Co.—For early historical dynamo machine.
W. J. Hammer.—For historical collection of incandescent lamps.
W. T. Henley.—For his cable core.
W. R. Sykes.—For his electric locking and blocking system of railway signals.

The Consolidated Telephone Construction and Maintenance Co.—For the general excellence of their exhibits.
Saxby & Farmer.—For their railway signals.
R. Johnson & Nephew.—For their iron wire exhibit.
F. Smith & Co.—For their iron wire exhibit.
R. S. Newall & Co.—For the general excellence of their exhibit.
W. T. Glover & Co.—For the general excellence of their exhibit.
Phillips Brothers.—For the general excellence of their exhibit.
Professor Monnier.—For his detector and analyser of fire damp.
J. W. Gray & Sons.—For the excellence of their exhibit.
Sanderson & Co.—For the excellence of their exhibit.

BRONZE MEDALS.

Binko & Co.—For their improved agglomerate battery.
E. Dent & Co.—For their non-magnetising watches.
E. Paterson.
G. Skrivanoff.—For his dry battery.
R. Webster.—For his non-magnetising watches.
Roth, Schlaefli & Co.—For their electric self-winding clocks.
J. F. Pratt.—Class X.
H. Whiteside Cook.—For his electric governor for screw marine engines.
Arnold & Sons.—Class X.
L. H. Borrell.—For electric self-winding remontoire clock.
T. R. Brailsford.—For water-level indicator.
J. Storer.—For electrical table fountain.
J. Willing.—For electrical signs.
B. Verity & Sons.—For brasswork.
G. Hawkes & Co.
Zanni & Co.
E. Müller.
E. Blouzon.
C. R. Goodwin.
Mignon & Co.
J. E. Liardet.
A. R. Sennett.
J. H. Athole Macdonald.
Philadelphia Dynamic Co
Alfred Apps.
J. E. and S. Spencer.
Julius Sax.
W. Groves.
Doulton & Co.
Automatic Telegraph Co.
J. Davis & Co.
School of Submarine Telegraphy.
Electric Railway Signal Co.
G. C. Lewis & Son.
Waterlow & Sons.

W. GARDINER,
Secretary.

Crystal Palace, *July 24th*, 1882.

THE AWARDS AT THE CRYSTAL PALACE ELECTRICAL EXHIBITION.—We fancy that a considerable amount of surprise, if not of something stronger, will be felt by the majority of the exhibitors at the recent Electrical Exhibition upon perusal of the lists of awards. We will not say anything of the Diplomas of Honour, as they do not enter the question. The awards of the medals (gold, silver, bronze) are, however, open to comment. We notice that Mr. Crompton is the possessor of a gold medal for the Bürgin dynamo-electric machine and the Crompton arc lamp. Messrs. Fyfe and Main must needs be content with a silver award for the Standard Fyfe-Main lamp. These latter gentlemen were dependent upon a Gramme machine for the production of the electric current, and Mr. Crompton had also to rely on another man's invention for his supply of current; therefore, we cannot think that the one should be credited with a higher degree of excellence than the other, if the two merits of the lamps are considered. Mr. Crompton, certainly, manufactures the Bürgin machines, and his exhibit was complete long before that of Messrs. Fyfe-Main; and, all things considered, the jurors may have had their reasons for the decisions given. The White House Mills Company receive a gold medal for dynamo-electric machines. This exhibit was, certainly, one of the most attractive of all—in a way that our readers will well understand. We, ourselves, never visited the Palace without making a mental note of the progress made, and the results obtained, at the stand of the White House Mills Co. It is still more surprising to note that Mr. E. Paterson, Messrs. Verity and Sons, the School of Submarine Telegraphy, and others, are favoured with bronze medals only. Messrs. J. and H. Gwynne and Mr. R. Hodson will doubtless appreciate the discernment displayed by the jurors in awarding to them silver medals for their fine specimens of direct-acting engines. Many of the recipients of silver and bronze awards will probably regret that they did not follow the example of Messrs. Siemens Bros. and retire from the competition. In our issue of the 8th April we expressed an opinion that the appointment of jurymen to report upon the comparative merits of the Electrical Exhibition was a mistake. We think that many of the exhibitors will now agree with us, that it would have been better to leave the Press and the public to make their own criticisms. We reprint above the report of the jury.

THE FINANCIAL RESULTS OF THE CRYSTAL PALACE ELECTRICAL EXHIBITION.—According to the report of the directors of the Crystal Palace, the receipts, compared with the corresponding six months last year, show an increase of £18,991. Comparing the expenditure, there is a diminution of £3,354. The number of visitors have been considerably in excess of the largest number that have attended the palace in any half-year since the opening.

ELECTRICAL EXHIBITION AT THE ROYAL AQUARIUM.—In our "Notes" of the 22nd ult., we called attention to the above proposed exhibition. In our supplementary pages to-day, further particulars of interest to intending exhibitors will be found. The building seems quite suitable for the new venture of the Aquarium management, and it reminds one, both in size and shape, of the Palais de l'Industrie, in Paris. It has a great advantage in being easily accessible from all parts of London.

SCIENTIFIC REPORTS ON ELECTRIC LIGHTING.—We extract from the "Money Article" of last Monday's *Standard* the following letter:—

Sir,—In your issue of Monday, the 24th instant, a letter of Professor Gordon appeared, and it could have only been written to injure, which I feel is not your wish. As a fact to base from, the patent I took out for the division and subdivision of the electric current was the first, and before this, it was viewed, not only by practical electricians, but the public and the press, that the electric light could never be used for domestic purposes until some means was devised to that end. I was given to understand that Professor Gordon himself was a worker in this direction, in what way I do not know, never having inquired, but certain it is that the means I had worked out and secured the patent for he was the first to veto. Another fact worthy of notice is that at the Paris Exhibition my appliances were not used, but many that exhibited at Paris made free use of my invention at the Crystal Palace to demonstrate facts they could not do at Paris. Between these exhibitions my patent became a public document, and the interest shown in the question speaks for itself by the first issue of the patent books being eagerly bought up and a second edition having to be published. The means I have devised are known to be simple, and many companies are using them, and abusing the inventor to cover their doings. A reckoning must come about sooner or later, but legal technicalities at present bar the way.

It may be well to state how Mr. Gordon came upon the scene. He was commissioned by gentlemen who contemplated forming a company on my inventions to inspect and report on the incandescent lamp I had produced. When he came he distinctly stated his mission—to see as to the merits of my lamp. He tested one at my works; others were sent to an address he gave. He gave a report and was paid his fee. It seems he offered some gratuitous remarks relative to the subdivision, which I have seen since in his letter to the press.

You and the press in general have from time to time noticed my doings in this question, and I think I may fearlessly say I am the only person (firm or company) that has allowed free inspection of my works from the engine-room to the burning of the lights, the making of the filament to the mounting, the glass blowing, the division and subdivision of the electric current—in fact, all that tends to show the system; and my visitors' book bears attestation by signatures of men of known repute of all nationalities sufficient to convince any person that what Mr. Gordon assumes has no weight.

In conclusion, I would ask, may I invite the public through your columns to come and see for themselves how far I have met the question of lighting by electricity the cottage or the mansion, and thus judge between demonstrated fact and scientists' opinion; for Mr. Gordon has not, even as one of the public, visited my works during the six months I have kept open show-rooms on the Viaduct more than the occasion referred to, than having a lamp taken down and testing it. I, therefore, leave the public to judge between us.

I am, Sir, the public's obedient servant,
JOHN BANTING ROGERS.

47, Holborn Viaduct, *July* 29, 1882.

We have often wondered why Mr. Rogers has kept o unaccountably in the background as far as letter-writing is concerned, but we no longer wonder why he has hidden his "light" under a bushel in the face of this effusion. Such a silly and unmeaning epistle we have rarely had the misfortune to peruse.

We deal in our other columns with the *invention* of Mr. Rogers for the division and subdivision of the electric current.

The idea of producing a visitors' book to convince any person that Mr. Gordon's opinion has no weight is novel and

amusing, and shows that Mr. Rogers is *really* endowed with inventive faculties.

It will be remembered that in our "Notes" of last week we published Mr. Gordon's letter to the daily press and also the reply to it from the solicitors of the J. B. Rogers Company. Mr. Gordon has again taken up the matter, and the following appeared in Wednesday's *Times*:—

July 27th, 1882.

Sir,—I observe in the *Times* of Tuesday last a letter purporting to have been written by Messrs. West, King, Adams, and Co., in reply to mine of the 21st inst.

Will you kindly permit me to say that I never sent a draft report to any one, and that it is not the fact, as stated by your correspondents, that I struck out of my report the part relating to the system.

The facts are as follows: My report was dated and sent in on the 3rd of June, and consisted of two parts, one having regard to the lamps, the other to the system. Subsequently, at the request of the gentlemen interested in the formation of the company, and upon the understanding that they would organise a company to manufacture the lamps, and would abandon the system, I divided the report into two parts, both being signed by me and left with them.

At an interview on the 9th of June with the then intended directors I found that they were unaware of my report on the system, and at the request of the then intended chairman I, on the same evening, sent him a copy of it. He duly acknowledged its receipt, and stated that he would read it to his colleagues.

I heard nothing more of the matter until on the 10th inst. the advertisement of the company came out, and it then appeared that of the nine gentlemen whose names on the 9th of June were printed on the proof prospectus as directors only one remained, and that the system was put prominently before the public.

My report was not quoted until July 20th, the day of the closing of the lists. I should not, however, have entered upon this correspondence if either my report on the system had been accessible to the public or the system had not been referred to in the prospectus.

I enclose a list of the Board of Directors as constituted on the 9th of June for your information, but, for obvious reasons, not for publication.

I am, Sir, your obedient servant,
J. E. H. GORDON.

Electric Lighting Contracts.—We are asked to state that the Metropolitan (Brush) Electric Light and Power Company Limited has secured contracts to light up the Royal Mint, the premises of Messrs. Halling, Pearce, and Stone, and the Floral Hall, Covent Garden.

Electric Lamps with Carbon Filaments.—We were correct in assuming last week in a note on the above subject that the Edison Electric Light Company would probably have applied, before the Electrical Review was issued, for an injunction to restrain the Swan United Electric Light Company from infringing the Edison patents. On Friday morning the 28th ult. the case was brought before Mr. Justice Chitty, when the defendants challenged these patents, and it was arranged that the motion should stand till the trial of the action, the defendants undertaking to keep an account. We understand that only one patent is involved, that dated 10th November, 1879, No. 4796. The Edison Company, we believe, seek to restrain the defendants from "making, selling, or using any electric lamp made according to or in the manner described in the specification filed in pursuance of the said letters patent, or according or in any manner only colourably differing from the same." With regard to the Swan lamp, we think we are correct in stating Mr. Swan's contention is, that the carbon filament is not made or secured to metallic wires as set forth in the above patent (10th November, 1879). We believe it will also be part of the defendants' case to endeavour to show that Edison's patent is void by reason of prior publication and also of insufficient description. We cannot foretell the ultimate result of this trial, but we hear that before bringing their action the Edison Company asked the defendant company to keep an account, &c., and this was declined. Of course, had the Swan Company so agreed, the Edison Company might have said that the defendants had given in. As the case now stands, however, it allows the defendant company to state that the motion for an injunction has failed.

The Yorkshire Brush Electric Light Company.—We have received information that The Yorkshire Brush Electric Light and Power Company (Limited) is about to establish a large central lighting station at Middlesbro', for the purpose of supplying the electric light to the various iron works on the marshes. The entire scheme will be carried out under the direction of Mr. W. Kingsland. This gentleman will be remembered by our readers as having had charge of the lighting of Chesterfield, by the Brush "Arc," and Lane-Fox incandescent electric lamps. A full description of this installation was given in the Electrical Review of April 15th.

The Phœnix Electric Light and Power Company.—In the Chancery Division of the High Court of Justice, before Mr. Justice Chitty, on Saturday last, a petition presented by Messrs. Foster, Hight & Company, accountants, who were creditors for the winding up of the Phœnix Electric Light and Power Company, was by arrangement dismissed.

The Electric Light in the City.—In a leading article entitled "The Mysteries of Electric Lighting," the *City Press* says:—"If the Brush Company, after twelve months' experience, can light with their system, *at a profit*, for £800 a district of the City that was formerly lighted with gas at a cost of about £700, why do they refuse to tender for lighting the rest of the City at a price that would produce them a very large profit, and yet doubtless be readily accepted by the Streets Committee? The calculation has been made that the price they charged for a light, equal to a hundred (?) candles, burning for twelve hours, was three farthings. If this can be done at a profit, no one will be more astonished than one of the most eminent electricians of the day, who, when asked the question, answered in the classical language of Goldsmith, Fudge!"

Speed of Working Through Cables.—Mr. John Pender, the Chairman of the Globe Telegraph and Trust Company, made a curious remark in the course of his speech at the above company's meeting last week. If correctly reported, Mr. Pender said, speaking of a new Company: "But as for the cable they intend to put down, it would be simply impossible for them to do their work. They assume that they will do twenty-five words a minute. Sir James Anderson, who has had great experience of what the *best manipulators* [the italics are our own] can do, will tell you that sixteen words a minute is uncommonly good work. Therefore the whole statement throughout is one that, I am sorry to say, shows the greatest ignorance on the part of those who concocted it, and I think it is using a mild phrase to call it ignorance. Probably they would not be able to work their system at more than ten words a minute." We have hitherto been under the impression that the speed of transmission through cables did not depend upon the manipulator, but rather upon the various retarding influences inherent in all long submarine lines. To the best of our knowledge the speed of working through the 1865 and 1866 Atlantic cables attained the rate of seventeen words each. Mr. Pender could probably tell what this means if the cables were employed for *duplex* working. We have reasons for believing that those responsible for the statement concerning the speed of transmission through this proposed new cable are, perhaps, the most experienced and capable men we could name for this class of electrical engineering, and that they know exactly what they are talking about.

Extension of the Network of French Cables along the North Coast of Africa.—The India-rubber, Gutta-percha and Telegraph Works Company have contracted with the French Government for the making and laying of 260 nautical miles of submarine cables and, as stated in the general meeting of the 25th ult., it is the intention to lay this cable with their ss. *International*, which is now on her homeward voyage from the West Indies. The cable is to be laid along the Coast of Tunis from Soussa to Sphax, and from Sphax to Gabes, or Kabes. The town of Soussa, or Susa, is situated on the coast 4½ miles from Ras al Marsa, rising gradually from the shore to the citadel at the south-west, within which is a conspicuous tower elevated 260 feet. The walls surrounding the town are from 30 to 40 feet in height, having bastions and towers at the several angles. Upon either side of the town are well wooded ridges, dotted with houses. The town has a particularly white appearance. Soussa contains several handsome mosques and well kept bazaars, and has manufactories of linen, with an active trade

in oil, wood, pottery, shoes, &c. The population is said to be about 10,000, and a British Vice-Consul resides in the town. The ruins of the ancient port are still visible. It was formed between two moles to the northward of the present town, but is now so filled up with sand as to afford but slight shelter even to boats. The southern mole projects nearly two cables from the shore, and has on its outer extremity an exposed battery of 12 guns.

Sphax, the ancient "Taphrura," is enclosed within high walls, is well built, having paved streets, and is reputed the prettiest town in the Regency. When nearing Sphax by sea a high tower and minaret form conspicuous objects. The country around for about five miles is studded with detached houses and gardens, well wooded and backed by a range of hills at about nine miles distant. Sphax contains manufactories of linen, and boats for the coasting trade are also constructed here. It carries on an active trade with Malta and Sicily in oil, esparto grass, sponges from the adjacent islands of Kerkenah, carilla, wood, and barley; fruit and vegetables are grown in the surrounding district. Cucumbers, locally called "sfakous," are said to give the name to the town. Rain falls only in winter, and the heat is tempered by a sea breeze throughout the day. The population of the town is about 6,000 inhabitants.

Khabs or Kabes is a town said to be of considerable size, situated a little within the coast upon the river or Wady Rif; there are a good many surrounding villages, and an active trade is carried on with Tunis, &c. A principal article of commerce is the red dye, called hennah (*Lawsonia inermis*), the plant from which it is procured being extensively cultivated in the neighbourhood. The town is defended by a well-built fort or tower. The port, which has not more than three or four feet of water, is formed by the mouth of a small stream running through the village of Jara.

On the Appearances of the Electric Arc in the Vapour of the Sulphuret of Carbon.—By MM. Jamin and G. Maneuvrier.—We made known to the Academy in the session of June 19th the modifications which the electric arc undergoes in the pneumatic vacuum when it is produced by a Gramme machine with high-tension alternating currents. We have found that the phenomena are modified if gases or vapours are introduced into the glass in which the experiment is made. These phenomena are very remarkable in the vapour of sulphuret of carbon.

The burner used in these experiments is formed of two vertical parallel carbons fixed at their base; the upper extremities, which are opposed to each other, can be brought into contact or separated by a simple mechanism. The apparatus is placed under a large bell of the pneumatic machine, and is exhausted as completely as possible. Under such circumstances the arc is not formed, but in its place there appear the lights of a Geissler tube. On introducing into the bell a few drops of sulphuret of carbon, so as to obtain an increased pressure of 0·05 to 0·06 metre, we see the arc enkindled between the points, and remain burning when they are withdrawn from each other.

At this moment there is, as it were, an explosion of light so bright as to be insupportable, and incomparably superior to the ordinary lustre of the arc. On examining it through darkened glasses, we see a brilliant arc of 0·05 to 0·06 metre in height, resembling a horse-shoe, or a capital Omega. The two extremities are at the two points of the carbon, and there is besides a long flame, like that of a furnace, which plays over the arc, escapes from it, and ascends vertically.

The points of the two carbons appear red and very brilliant, but the arc is of a pale green, and as its light overpowers that of the carbons, all the room is illuminated with this tint. The splendour increases so as to become intolerable as the tension of the vapour increases, but as the resistance of the vapour increases at the same time, the arc is often extinguished, and requires to be re-kindled every moment, by bringing the carbons in contact.

On examination with the spectroscope, this light presents all the rays of the carburetted gases in combustion, but more complete and better defined. The spectrum is very discontinuous. At its red extremity is a striped spot; first a very bright line followed by several others, more slender and close together, then a broader line which repeats the former, and which is also followed by fine rays; these appearances are repeated as we proceed towards the orange, but becoming fainter until they disappear. After a dark interval the same appearances are repeated in the yellow, and in the beginning of the green; then follows another dark interval, succeeded by a repetition of the same effects in the green, and finally in the violet.

To sum up, the spectrum is composed of four striped portions in the red, the yellow, the green, and the violet, so identical that, save for the colour, they might be taken for the same pattern transported from the red towards the violet. It is very probable that they obey one and the same harmonious law which remains to be discovered.

Of these four regions the green is much the most luminous, and gives the special tint to the arc, and colours all objects green.

Whilst these appearances are manifested a chemical action is produced. If air remains in the bell, and if the apparatus is not well closed, the sulphuret of carbon burns imperfectly; a cloud of sulphur fills the bell, and is deposited on the sides, whilst the carbon burns alone. If the air has been well exhausted, these clouds are not formed, but a brown deposit is fixed upon the sides, becomes black, adheres to the glass and dims it. This deposit is volatile, and has an odour resembling that of sulphur.

It is evidently a compound of carbon and sulphur, perhaps a proto-sulphuret corresponding to carbonic oxide, perhaps an isomeric modification of the ordinary sulphuret. We see, indeed, no deposit either of sulphur or carbon, and the pencils of the burner have neither lost nor gained anything. It is probable that the sulphuret of carbon is dissociated, the sulphur volatilised, the carbon diffused in vapour in the arc, and that this carbon and sulphur recombine in the flame to reconstitute a compound under different conditions: but this is mere conjecture not yet analytically demonstrated.

This experiment is remarkable for the extraordinary quantity of light produced, for the magnitude of the arc, for its colour, the character of its spectrum, and the chemical reactions which take rise. It will not probably be available for lighting on account of its colour, except for lighthouses, or for signals to a distance.—*Comptes Rendus.*

NEW COMPANY REGISTERED.

Standard Time and Telephone Company (Limited).—Capital £100,000, in £1 shares. Objects: To acquire and work inventions having reference to the transmission and regulation of time or timekeepers by electricity or otherwise, and for the accumulation and dispersion of electric currents; also to carry on the usual business of a telephone company, and to manufacture electric, magnetic, and pneumatic appliances of all kinds. Signatories (with five shares each): P. J. Morrison, St. Albans; E. Ray, 5, Percy Street, Bedford Square; E. A. Bacot, 35, Oakfield Road, Clapton; R. W. Cole, 153, Hemingford Road, N.; F. Bigg, 39A, Threadneedle Street; J. Usher, 25, Barnsbury Park; E. S. Parker, 75, Cornhill. The signatories are to appoint the first directors and determine their remuneration. Qualification, 1,000 shares. Registered 26th of July, by Newman and Co., 75, Cornhill.

NEW PATENTS—1882.

493. "Preparation and manufacture of asbestos as an insulating material for electrical apparatus and for other purposes." C. J. Allport. Dated February 1.

3557. "Telephonic appliances." J. Munro and B. Warwick. Dated July 27.

3570. "Electric arc lamps." F. M. Newton. Dated July 27.

3575. "Electric lamps." J. G. Lorrain. Dated July 27.

3576. "Improvements in distributing and measuring electricity and in apparatus to be employed for those purposes." J. Hopkinson. Dated July 27.

3582. "Improved means of regulating electric currents and electromotive force and apparatus thereof." L. Campbell. Dated July 28.

3583. "Electric lamps and machinery and apparatus connected therewith for obtaining and transmitting power." W. T. Henley. Dated July 28.

3591. "Electric producer and power machines." J. Imray. Dated July 28.

3592. "Secondary batteries." F. J. Bolton. Dated July 28.

3595. "Electric telegraph and apparatus employed therein or connected therewith." J. H. Johnson. (Communicated by E. Estienne.) Dated July 29.

3616. "Generating electricity." J. R.(?) ROGERS. Dated July 31.

3619. "Facilitating electric lighting." J. VERITY. Dated July 31.

3655. "Electric lamps." O. G. PRITCHARD. Dated August 1.

3661. "Apparatus or appliances for use in telephonic circuits." J. W. FLETCHER. Dated August 2.

3665. "Construction of the plates of secondary or electrical storage batteries." T. CUTTRISS. (Partly communicated by C. Cuttriss.) Dated August 2.

3666. "Improvements in wires or conductors for electrical purposes, and in the insulation thereof, and in means or apparatus and materials employed therein." P. R. DE F. D'HUMY. Dated August 2.

3681. "Apparatus used for facilitating telephonic communication." J. COWAN. Dated August 2.

3685. "Dynamo-electric machines." W. R. Lake. (Communicated by H. C. Sample and F. Rabb.) Dated August 2.

3689. "Apparatus for regulating the transmission of electrical energy and the speed of steam-engines and other motors for electric lighting and other purposes." W. R. LAKE. (Communicated by M. Levy.) Dated August 2.

3691. "Improvements in the construction of channels or courses of suitable form and materials through which wires to be used for electrical, magnetic, telegraphic, and telephonic purposes may be passed, secured and protected, and also when needed for insulating such wires and for other useful purposes." G. M. EDWARDS. Dated August 2.

CITY NOTES.

OLD BROAD STREET.

THE ANGLO-AMERICAN BRUSH ELECTRIC LIGHT CORPORATION (LIMITED).

ON Thursday an extraordinary general meeting of the shareholders of this company was held at the City Terminus Hotel, Cannon Street, under the presidency of Sir Henry Tyler, M.P.

The secretary, Mr. W. J. Cordner, having read the notice convening the meeting,

The Chairman said: Gentlemen, as you have seen from the notice, our only business to-day is to confirm the resolution passed on the 18th July. The meeting is, therefore, called in accordance with the 51st clause of the Companies' Act, 1862. In accordance with that we have summoned you within a month, and also within more than fourteen days from the last meeting, to ask you to confirm the resolution which you passed on the 18th July. I do not think, as I stated fully on that occasion the object of the resolution—I do not think I need detain you on the present occasion at any great length. It is simply to enable us to distribute amongst you the sum of £245,000, which we hold at our disposal, and for which we have had warrants prepared, so as to be able to furnish you with the very satisfactory interim dividend of 100 per cent. upon all you have subscribed upon this undertaking. I beg to move this resolution: "That the 85th of the Articles of Association be repealed," and that in lieu thereof the following be henceforth adopted as the 85th Article:—"The directors may from time to time, on their own authority, pay to the members, in proportion to the amounts paid up or credited as paid up, on shares held by them respectively, such bonus and such interim dividend as, in the judgment of the directors, the position of the corporation justifies."

Mr. Scudamore Sellon: I will second that.

Mr. Hammond said before the chairman put that to the meeting he should like to say one word. Of course the resolution deals with the distribution of dividends, and those who hold shares in the company were glad to hear that 100 per cent. was being declared in that way; but it did not quite rest there. When shareholders received a dividend they were glad to have an idea of how the dividend was being earned (hear, hear). He thought it was well within the province of the meeting just to ask the directors, through the chairman of the company, to give a slight hint to the shareholders in that respect. He thought it desirable for more than one reason. They were told outside that this company, with which, as some of you know, I am vitally connected——

The Chairman: I think you are also engaged in another company?

Mr. Hammond replied that he had been careful to put it that he was vitally interested in that present company. The policy of the Brush system had been to cover the whole of England with sub-companies, working enthusiastically in various parts of the country. When first he had the pleasure of being connected with this company the Brush system was not so widely known in England as at the present time. He did claim, in spite of the call to order by the chairman, that he was vitally interested in this company. The Brush machine had been placed by him in a place where it was before unknown, and he was daily engaged in pressing forward the fortunes of the Brush system. The shareholders would see, and those outside that room, outside that company, would see that there are those who ignorantly assume that no profits were being made by the company in their manufacturers' branch. They were told that the declaration of a 100 per cent. was simply made by selling sub-concessions. The policy of sub-concessions had been held up to ridicule. They were told most distinctly that the company was losing money in its manufacturing branch. Therefore, although the shareholders were glad to receive 100 per cent., or a bonus, or whatever it was called, he thought they were entitled to have a hint as to whether the 12½ per cent. declared beforehand in the working branch would not become a mere bagatelle compared with the amount likely to be declared, which was at the present time being earned in that direction. There were outsiders who were constantly assuring the public that the whole thing was a sham. He was personally passing on orders to the company. He thought they had yesterday the invoice of five forty-lighters, a machine which had not been touched previously by any other company. While he was personally passing on those orders, he felt that all the sub-companies were doing the same, he thought there would be no objection on the part of the board to say a word to the shareholders and to those who are interested in the Brush system that the company is in a solid position, irrespective of the money earned out of those concessions, and which they might make in the future, and that behind all this business there is a question of giving not only 100 per cent. to-day but another to-morrow (applause).

Mr. Baker said he endorsed the remarks made by Mr. Hammond, and he should like to ask if the chairman could conveniently give them some idea of the large amount of concessions which would be retained because, of course, they were receiving a very fine bonus or dividend, and there might be good things to come by the end of the year or this time next year. If it were convenient he should like to have some idea of the amount. They had to supply them with the future of the company.

The Chairman replied that he did not know that the remarks made had been strictly in order. The proposition he had made was a very simple one: that the articles of association should be altered for a particular purpose. At the same time he was always ready to go out of his way, though if transgressing the rules of order on occasions when it was desirable to do so, to legitimately give information to shareholders. As to Mr. Hammond's remarks, it was true that they had formed a great number of sub-companies, and they did so with this idea: We said to ourselves, the introduction of this system of electric lighting, or any other system, over the United Kingdom, but also over a great number of foreign countries, is a gigantic business. It is not a business that such a limited capital as we possess can possibly undertake; and therefore, in order that this business may be properly transacted, it is desirable for us to engage other companies with us in this great work, and in order to do that we will, at a reasonable price, sell concessions to different parts of the United Kingdom, and sell our patents to those foreign countries where we have patents. We may as well induce a great number of people to come to work with us in forming the business; we will do our part in manufacturing the apparatus, while they do their part in making installations and applying the apparatus. Well, unfortunately, instead of the business being conducted in an entirely reasonable manner, as they hoped when they started, they had found it had led to a considerable amount of speculation; and that whereas they sold at reasonable prices when they started—and he might say that Mr. Hammond had been instrumental in selling those concessions and in working the business—they found people came crowding upon them and buying those concessions, and that enhanced their values; and complaints were made between one and another that they could not get all they wanted; and not only so, but people to whom they sold, with the only object of starting in different districts, began to sell sub-concessions, till they saw less of the lighting work done and more of the sale of sub-concessions than they could wish. That he took to be a rather unhealthy state of things. And not only so, but the value of their shares ran up to a very high price indeed; there was a sort of mania for buying these things. The board thought that a disadvantageous business. They hoped to see it reasonably conducted. However, they must take things as they were. He was very happy to inform them, as far as he could, their position. The shareholders knew they, the board, only made up their accounts once a year. They had now no annual balance-sheet to lay before them on that occasion. When Mr. Hammond said that people, ignorantly assuming certain things, considered the whole thing a sham, and wanted to know where their dividends came from, he could only say that those on that side of the table could only smile at such an expression. They would be glad to show their works, and be happy to show them to any shareholder who wished to look over them. There was a very large amount of work being performed in manufacturing apparatus. The company had no less than 800 men employed in the business. In fact, their manufacturing profits for the last six months had been £30,000 (hear, hear). Whether that was the worst or the best half he was not going to prophesy. When Mr. Baker got up and asked what would be the profits of the next half-year, he thought it was a little more than he could tell.

Mr. Baker remarked that he did not ask what amount they were about to receive, but what they had received for the sale of sub-concessions.

The Chairman added that he did not think on that occasion that he ought to answer that any further than at the last meeting. On reviewing their balance-sheet, they determined to divide the amount of £245,000; and in order to protect themselves they had taken care that there should be a considerable margin in hand, and, under all the circumstances, that was the amount the board now divided amongst the shareholders. As to going further into the question of what amounts were in hand at the end of the half-year, and what amounts were likely to be earned, he could not go into that question at all.

Mr. Wood asked if the first or second six months of the year were the most productive?

The Chairman said that that was prophecy again. He believed that the second half of last year had been most productive, but that did not prove anything regarding this year. It would depend on the orders received, and the consequent profits.

Mr. Wood said that he should be glad if the board could have taken the *bona fide* shareholders more into their confidence, and so endeavoured to dispel some of those rumours regarding the company. He was sorry to see that their stock had been made the subject of

speculation on the Stock Exchange, and that tended very much to undermine the confidence of the *bona fide* holders. If they could be taken more into their confidence it would be more agreeable to those who were not speculators but shareholders.

The Chairman said that they were taken entirely into their confidence. As to their shares being the subject of speculation, really the directors had nothing to do with that; and in everything that he had said he had tried to stop that speculation. It was very much to their disadvantage that that should go on, and it was the fault of the gentlemen who chose to speculate and thus run their shares up to what he thought too high a price. It was not for them either to sustain or depreciate the stock. They had nothing to do with it, and did not want anything to do with it. He had been the more guarded on this occasion because of the mania for speculation, and he would not say either one way or another one word that would help that speculation either to put up or put down the value of the stock. That was the reason why he had determined to be so guarded in what he said. If Mr. Wood could suggest any figures that might be given that would be of any use with regard to their past history he should be glad to supply them; but as to what might happen in the future he must decline to speculate.

A shareholder asked whether the greater portion of the money which it had been stated they had received for concessions was represented by cash, or whether it was made up of paid up shares with the subsidiary companies.

The Chairman said that was a perfectly legitimate question, and he had no hesitation in saying that they held a large proportion in paid up shares of the subsidiary companies which they had taken instead of cash, and which they were obliged to take in many cases.

The resolution was then put to the meeting, and unanimously adopted.

On the motion of Mr. Henry Maudsley, a vote of thanks to the chairman was carried by acclamation.

The Chairman briefly responded, and the proceedings terminated.

EASTERN TELEGRAPH COMPANY (LIMITED).

On Thursday last an extraordinary general meeting in connection with the above company was held at the offices of the company, 66, Old Broad Street, Mr. John Pender, M.P., presiding, for the purpose of confirming a special resolution, which was passed unanimously at a general meeting held on the 13th ultimo.

The Secretary, Mr. George Draper, having read the notice convening the meeting,

The Chairman said: Gentlemen, as you are aware this is a special meeting for a special purpose; and that is to move the confirmation of the resolution which was passed at the previous general meeting of the company. I shall therefore call upon the secretary to read that resolution.

The Secretary accordingly read the resolution, which was as follows:—

Resolved—A. That the board of directors be, and are hereby authorised from time to time to create and issue mortgage debenture stock of the company to an amount not exceeding one-third of the share capital of the company for the time being issued and paid up, upon the terms that the aggregate amount of the said stock for the time being in issue, and the interest thereon shall rank *pari passu* as a first charge on the undertaking and revenue of the company, the stock to be issued at such times, in such amounts, and on such terms and conditions as the board shall from time to time determine, for the purpose of redeeming by exchange or otherwise the outstanding debentures of the company, and any other purpose to which capital of the company may be lawfully applicable.

B. That the board be, and are hereby authorised to make such provision as they think fit for the registration and transfer of mortgage debenture stock, and for the delivery of certificates thereof, and for the issue of stock warrants to bearer transferable by delivery, and of interest coupons attached to such certificates and warrants or otherwise, and for the conversion of warrants to bearer into registered stock and of registered stock into warrants to bearer, and generally as to the form and incidents of all documents relating to the said stock, but so that no such provision be inconsistent with paragraph A of this resolution.

C. That the board be, and are hereby authorised from time to time to purchase in the market, and hold and deal with any amounts of such mortgage debenture stock for the purposes of any reserve fund or investment of the company, and, with the sanction of a general meeting, to apply other moneys of the company to the purchase in the market of any such stock for cancellation, and, with the like sanction, afterwards to re-issue mortgage debenture stock in lieu of all or any of the said stock so cancelled, provided always that the amount of mortgage debenture stock issued and outstanding shall never exceed the limit prescribed by paragraph A of this resolution.

The Chairman: You have heard the resolution read; I beg to move that the same be, and hereby is confirmed.

The Marquis of Tweeddale seconded the motion, which was put to the meeting and unanimously adopted.

The Chairman: That is all the business of the day, and we have now to act upon the resolution, and I hope that we shall be able to turn it to good account.

On the motion of Mr. Griffiths, seconded by Mr. Wells, a vote of thanks to the chairman was passed unanimously, to which the Chairman having responded, the proceedings terminated.

THE RAILWAY AND ELECTRIC APPLIANCES COMPANY (LIMITED).

On Friday, the 28th ultimo, under the presidency of Mr. Wm. Alex. Smith, of Glasgow, the statutory meeting of this company was held at Cannon Street Hotel.

The Secretary, Mr. Wm. Skinner, having read the notice convening the meeting,

The Chairman said: Gentlemen, I have to express the regrets of our noble chairman, the Duke of Manchester, who is unable to preside to-day owing to another very pressing engagement. He expressed his regret at the board meeting this morning, but hopes to have the pleasure of meeting you on a future occasion. Gentlemen, you are probably aware that this is what is called a statutory meeting, that it is a meeting which must be called within four months of the registration of the company, in conformity with the Act of Parliament. Of course, you are probably aware that although our company was registered four months ago we have not been in possession of our property until the last six or eight weeks, so that really the directors have only to report upon what has been done during a very limited period. I have to mention that two of our directors have lately visited Glasgow and inspected the works acquired by this company. You are aware that the works were situate in two different parts of Glasgow. The principal works which have become the property of this company were situated two miles to the south side of the city; the telephone apparatus and smaller electrical appliances manufactory was situate inside the city, thus necessitating very much waste of time in the transfer of goods from one of the works to another. The result of this is that it has been deemed expedient that the work should be concentrated under one roof, and thereby effect a very considerable saving. We have ample room for the extension of our works at Polmadie. Plans have been prepared and approved by the board whereby the object we now desire will have been obtained. In the meantime we have devoted our energies principally to consolidating the work we have in hand, getting up patterns for work we know we shall obtain, and generally organising the works, which will undoubtedly lead us to results which will enable us to have a profitable investment for our money. Some time ago we received authority from a commission of engineers appointed to inquire into electric lighting to send appliances to Chatham. This was done the week before last. Reports concerning the Maxim lamp are satisfactory to a degree. It is quite true that the Maxim lamp requires more power to drive it; but, on the other hand, it has advantages which will show it to be one of the best, if not the best incandescent lamp before the public. In the first place it is not so liable to break as other lamps. Two sessions ago the Glasgow Art Union asked us to fit up their galleries with electric lights, and after a series of experiments, which lasted over several months, we finally fixed upon the Maxim lamp as the best for the purpose; and the art galleries have been lighted by the Maxim lamp with perfect satisfaction to every one. During the last two sessions we have been able to replace 264 gas jets with 60 Maxim lamps, with the result that they not only got a better light, but a perfectly cool atmosphere even when the room was crowded, and the colours came out by electric light as they do by daylight. Now, the importance of that fact is almost sufficient, to those who have really thought the matter out, to convince any one that, be it this year or be it next year, electric lighting must take the place of gas. I care not how much you may improve the burners—and there have been vast strides made in that direction when they have been compelled to do it—but the fact remains that the light from the gas does change colours, and does prevent many people from distinguishing different shades. But this is not where it ends. Gas consumes the very life-giving property of the air—oxygen. When I tell you—which you would hardly believe—that the small gas burners consume as much oxygen as five men can consume, you can calculate how it vitiates the atmosphere when ten burners are going at a time in a drawing-room. My opinion is that the lamp we have acquired is one of the best, if not the best, yet brought before the public. I look forward to the time with a little patience and energy when there will be a vast field for the development of this incandescent light, especially amongst ships. I have the authority for saying this of Mr. Burns, one of the largest shipowners in the world, who says he does not expect to fit out another vessel without the electric light. This is only one of the many shipowners who have expressed their opinion. When we are in a position to conclude these orders, we may obtain a large share of the orders which Mr. Burns has to give. Another most valuable asset of our company is the Williams's Railway patents. They, to a certain extent, change the system of working railways in this country. They do away entirely with what is called the V crossings. They avoid all breaks in the main line of railway, and prevent many accidents, such as from the tire going the wrong side of the point. They enable you to put down a crossing at any part of the line you like without interfering with the main line; but that is not the only advantage they have. The present system of crossing takes a gang of men something like eight hours to fit in. That is, I mean, if any defect is discovered before an accident, and has to be adjusted, it takes that time to fit in. During that time the main line traffic is interrupted; whereas by the cross over system, which belongs to us, you can very easily fit up a crossing in half-an-hour without interfering with the main line. Why has not this system been adopted more largely? It was four or five years before Sir Henry Bessemer got steel rails adopted, and further, I may say, that the largest and most powerful railway has not yet adopted what has been practically admitted to be the only safe brake—the Westinghouse brake. The William's system is adopted on ten miles of line between Glasgow and Wemyss Bay. The Government inspector has inspected that line and reported very favourably on it. I have therefore, gentlemen, very little doubt in my own mind that with energy and pushing this matter, and by not being afraid to spend a certain sum of money in laying down experimental cross overs, and in demonstrating to the railway officials the advantage of these lines, we shall revolutionise the present system of railways. With these words I would ask you, gentlemen, to approve of the general action of the directors up tothis. If any gentleman has any question to ask I should be glad to answer him.

Mr. J. B. Hamilton (an original shareholder): In the prospectus the amount of capital asked for was £250,000, and I understand the amount of shares allotted is £100,000.

The Chairman: £180,000; about £170,000 was really all that was asked for.

Mr. Hamilton: The original was to be £250,000, of which the vendors were to have £95,000.

The Chairman: No, sir; £80,000.

Mr. Hamilton: The prospectus says £95,000.

The Chairman: Of which £80,000, at the option of this company, might be given in shares.

Mr. Hamilton: There is £195,000, including vendors' shares.

The Chairman: You are quite wrong, if you will excuse me saying so.

Mr. Hamilton: Well, then, call it £180,000 (laughter). The amount of profits in the first case would be 80-250th parts; if all the capital had been subscribed the vendors would get about one-third of the profits. Now that the capital is £180,000, you see that the proportion will be that the vendors will get 80-180th parts instead of 80-250th parts. Now, I would just suggest to the shareholders whether it is not a proper thing for us that the vendors should make an abatement to the extent of the difference. I say that the shareholders should consider whether they should not insist upon that, because on the face of the prospectus it was never contemplated that the vendors should get more than 95-250th parts. With the present limited capital they get much more (applause).

The Chairman: If any other gentleman has any question to ask, I may as well answer them all at once.

No further question being asked,

The Chairman said: I can only say I am very much indebted to Mr. Hamilton for having brought this matter up. Mr. Hamilton has clear ideas of what is right and wrong, and of what is fair and what is unfair. I have had the pleasure of knowing him for a number of years, and I can listen to any expression of his opinion with the utmost respect. I may tell Mr. Hamilton this, that his figures, although not exactly correct, his idea is correct. You must recollect this, Mr. Hamilton, that if the development of business requires it the directors have power to issue £500,000, which would only give the shareholders one-sixth instead of one-third part. The contract is made on a certain basis, that if we choose to issue our capital the vendors must be contented with one-sixth profits. Seeing that the capital is not fully subscribed, they are entitled to the proportion of £100,000. The new shares are just entitled to as large a proportion of the profits, the same as the vendors; there is no difference between them.

Mr. Hamilton: I have only suggested the thing to the meeting; if they think anything of it, they can think it over. I don't want to put it as a resolution.

The Chairman: No further question being asked, I think the business of the meeting is ended. I thank you for your attendance, and I hope we shall have a statement to put before you next time we meet that will please you.

After a vote of thanks to the chairman, moved by Mr. Cummings, the meeting separated.

DIRECT UNITED STATES CABLE COMPANY (LIMITED).

The tenth ordinary general meeting of this company was held at the City Terminus Hotel, Cannon Street, on Friday, 28th ult., Mr. John Pender, M.P., chairman of the company, presiding.

Mr. J. W. Fuller, secretary, having read the notice convening the meeting and the report having been taken as read,

The Chairman said: Before making any general remarks I think it is necessary to give you a few figures as showing the working of our system during the past six months. Our revenue for the half year ending June 30th, after deducting out-payments, has amounted to £61,825 8s. 2d., and the working and other expenses, including interest on debentures and income tax for the same period, amounted to £24,979 3s. 2d., leaving a balance of £36,046 5s. 1d. as the net profit for the half-year, making with £4,623 0s. 8d. brought forward from the previous half-year a total of £40,669 5s. 9d., which has been appropriated as follows: Interim dividend of 5s. per share at 31st March last, £15,177 10s. 0d.; final dividend of 5s. per share at 30th June, now proposed, £15,177 10s. 6d.; carried to reserve fund, £9,531 9s. 1d.; written off for preliminary and arbitration expenses, £500; carried forward to next year, £282 16s. 8d.; total, £40,669 5s. 9d. Owing to the shilling tariff the revenue is much less than at the corresponding period of 1881 when the tariff was two shillings. It was hoped with the shilling rate adopted that the traffic would respond to the reduced rate. But ten months' trial of the rate has found that not to be the case. The American Telegraph Cable Company opened one cable at a tariff of two shillings on May 15th, and that tariff was in force on the other cables from May 22nd. A second cable was opened on the 30th ultimo. That company has actually participated in the joint traffic in respect of one cable from May 15th and two from June 30th, in proportion as agreed upon. The agreement entered into with the land company on the American side is working well, and the benefit of reduced expenses will be seen in our future half-yearly accounts.

Proceeding to the expenditure, it may be observed that while most of the items have either been reduced or remain practically the same as last year, there are one or two increased amounts. The salaries show an increase of £903. This is accounted for by the engagement of additional clerks in the December half year, and circumstances fully explained to the meeting on the 27th of February last. Comparing this item with the December accounts, however, it will be found to show a reduction of £291. For printing, stationery, and advertising there is an increase of £48 in London and £202 at stations, which has been caused by the increased consumption of message forms and other stationery and by advertising in regard to the two shilling rate. On the whole, however, the expenditure has been less than the corresponding period of 1881. During the financial year just ended we paid 5 per cent. to the shareholders, and we added £9,500 to the reserve fund. But it is only by the aid of two months of the two shilling tariff that this result has been obtained. Therefore you see, gentlemen, that while it was all our desire to maintain the shilling tariff, it would not pay. That is the real business expression—it would not pay. When I had last the pleasure of addressing you it was to ask your approval of the working arrangement just referred to, namely, with the American Telegraph and Cable Company and with the Western Union Telegraph Company. These arrangements are now in force, and, as you are aware, the joint companies are now working under the two shilling tariff. So that at the present moment the companies have no less than eight cables across the Atlantic, and when these are in good working order and duplexed they would for all practical purposes be equal to double the number, so that comparing the carrying power of the cables with the traffic there is a large surplus carrying power equal to any growth of traffic that is likely to occur for a considerable period. Now, gentlemen, if we felt that we could employ the surplus carrying power at the shilling rate, we should never have reverted to the two-shilling, and after experiment, which was fairly and honestly attempted, we were obliged to make up our minds to resort to the more paying tariff. Had we not done this I should not have had the pleasure of submitting to you the dividend which I now recommend. Do not misunderstand me. I believe there will be a considerable growth in submarine telegraphy, but its rise is slow compared with the rise it has made during the last twelve years. So far as figures prove anything, it would have taken us, under the shilling rate, at least four or five years before we could secure the return which we now do under the two shilling rate. That would have involved a loss of one and a half to two millions sterling. Looking to the fact that your dividends have never been large, and to the enormous benefit which these telegraphs confer upon the commercial as well as political and social life of the world, I think it would have been asking too much of the shareholders of this company to give up for a term of years the dividend to which they were fairly entitled. In previous addresses to you at these half-yearly meetings I have given you much information, and placed before you many figures on the subject of telegraphy. On the last occasion I proved to you by figures that the shilling tariff was not sufficiently remunerative, even upon the reduced prices which telegraph property can be constructed to-day, because the feeling is that our stocks are watered; but if you take the cables now laid and working well, they could not be replaced by the amount of capital represented by the market value of the respective companies, not to speak of the large reserves held by some of them, so that that puts the question of working entirely aside. The value of a thing is what it will bring in the market, and the price in the market to-day with the shilling tariff would never give anything like the return upon the investment; but, notwithstanding all this, it must be a great field for enterprise, and the more uncertain it seems to me, the more mysterious, the more indefinite, and the more risky the operations are, they seem to be just the very thing which attract company promoters, and command more attention than those enterprises which are sound and more easily understood. For instance, we are now threatened with two additional cable companies in the Atlantic: one, the European and Canadian Company—I think it destroys itself by the fallacy of its own figures, and the letter addressed to the *Times* by Mr. Weaver, of the Anglo-American Company, proves this; and I think there is no harm in my calling public attention and the shareholders to the subject of their position. Their position is this: assuming that the two cables could obtain a full proportion, or 1-5th of the total of the traffic, assuming a traffic of 16 million words per annum, then they would have to carry 3,200,000, which, at 9d. per word, would yield £120,000, an amount which would fall far short of the remuneration for working expenses, reserve fund, and paids-out. If we take these figures, putting in the working expenses and paids-out at £48,000, and the renewal fund at £45,000—which, by the way, is not provided for in the prospectus set forth—there would be a loss of £5,000. It is necessary to draw attention to the statement that in this sum of £80,000 the paids-out and the amount of money paid away for land-lines transmission in the United States, Canada, and England, are calculated; reckoning the sum paid out at only 1s. 2d. a word, would amount to £20,000; but reckoning it at 3d. a word and this is what I should think could be the lowest average, it would absorb £4,000. There is no doubt as to their working resulting in a loss instead of profit at the price they profess to work it. There is no special provision made for cost of repair and interruption of cables, which is certain to occur. We know what these have cost this company, and what they cost all other similar enterprises; such repairs cost this company £90,000 during first year of its existence for repairing one cable only, and this is an item that this new company has entirely left out of their calculations. With regard to the proposed adoption of the mutual principle, let me suggest that it is possible that this system may resolve itself into a mutual subscription system, to make up the loss which would certainly fall on those who enter into mutual obligation and enterprise. Rumours of telegraph companies seem cropping up every day. Speculators, no doubt, have a great deal to do and say in these reports, because they are a very good handle for depressing and influencing the stock market. But for those who have placed their money in them for investment I would say, "Do not be frightened or run away at the reports circulated for interested purposes. If it does depress the stock, the low price will eventually strengthen those companies by bringing in a large number of *bonâ fide* investors, who will ultimately reap the advantage." It is my duty on an occasion like this to warn our own shareholders not to be alarmed, to rest satisfied that those who are watching over their affairs will take good care they are fully looked after

and shareholders will be well informed and advised whenever occasion renders it necessary. There is no question at all in my mind that the combination threatened by the Eastern Cable Companies and the Western Union Telegraph system of America will carry under any circumstances the bulk of the traffic, for the best of all reasons that they will be able, with an improved system at their command, to deal with their work more expeditiously than any new system could possibly do, and speedy telegraphy means time to the commercial man. Now, gentlemen, I hope you will excuse my making these remarks to you, because the submarine system is now become so very important that it has become for the world a necessity, and it would be a grave misfortune if for speculative purposes the property of a system so beneficial to the world should be discredited by men whose only object is to get a little money out of the contracts in the first instance. I trust telegraphy has a sounder basis, and those who have ventured into this particular class of property will have the satisfaction of knowing that it is now recognised property, and that the amount of good if not so large to themselves is likely to be in time so developed and matured as to make it a sound investment for them, and for the world it is really indispensable. With these remarks I beg to move that the report of the directors, dated July 19th, 1882, together with the statement of accounts to June 30th, be, and the same hereby is, adopted, and a final dividend of 5s. per share free of income-tax be declared, making with interim dividends a total dividend of 5 per cent. for the year ending June 30th, 1882.

Mr. Ford seconded the motion.

Mr. Jackson said that while he was glad that the company was so flourishing, and while cordially endorsing the chairman's remarks as to the value and efficiency of the telegraphic communication through the old companies, he thought it would be well in regard to the accounts to remove from the capital account the small balance in regard to the preliminary expenses. It was small and they had reduced it from time to time, but he thought it would be satisfactory to see it removed from the accounts altogether.

Mr. Newton said that since he had come into the room he had had a letter handed to him in regard to the new scheme circulated in the newspapers; he referred to Mr. Weaver's letter. He thought it should be circulated amongst all the shareholders. He believed that the scheme was simply to put money into the pockets of a gang of schemers, and it was no use mincing the matters. It was simply a combination of promoters of companies, and he was sure that existing shareholders would never benefit by the multiplication of telegraph companies. He was certain that they would have to battle with this difficulty sooner or later, and it was better, he thought, to take vigorous measures at once.

The Chairman: With regard to Mr. Jackson's remark he is perfectly right. But we have been writing off every year, and it was even discussed as to whether we might not write off a large sum at this time. But as we were placing a smaller sum to the reserve fund, and this last half-year embraced a considerable proportion of the shilling tariff, we thought it better not to be too severe on the shareholders, as we were desirous of maintaining the average interest at 5 per cent. As we have come back to the two shilling tariff we shall able, I think, be to put aside a larger sum than this shortly. As regards Mr. Newton's remarks, there is no doubt that Mr. Weaver's letter is one which must commend itself to all thoughtful men about this new company. As far as I can hear I think it has pretty well destroyed it; but still more destructive to their interests, I think, is their reply to Mr. Weaver. The weakness of the secretary's reply is so plain that any one who runs may read; and as to fighting them, they say, "Burnt bairns dread the fire." I am afraid the only way in which we can get rid of it is simply by people losing a little money by it, because it is as true as possible the companies which are now existing and which have got a certain amount of goodwill and position unfortunately stand at the present moment at 50 per cent. discount, and a new company cannot expect their stock to stand higher. I cannot conceive how they can get 20s. for an article not one half—not one fourth—as valuable as an article which can be bought in the market for 10s.; but they say that it takes ten years to bring up a crop of fools, and I think we are in that position now, and, so far as I can learn, there is very little chance of this new company ever getting beyond the paper of the prospectus which has been issued.

The resolution was then put to the meeting, and carried unanimously.

The Chairman then moved that Admiral Mayne be re-elected a director of the company.

Mr. Quilter seconded the motion, which was also carried unanimously.

The Chairman next moved that Mr. Charles Meara be likewise re-elected.

The motion was seconded by Mr. Ford, and carried.

Mr. Jackson moved that Mr. John G. Griffith and Mr. Joseph Sawyer, the retiring auditors, be re-elected.

Mr. Newton seconded the motion, which was likewise carried unanimously.

Mr. Griffiths and Mr. Sawyer briefly returned thanks for the honour done them.

Mr. Jackson said that it was usual, and he thought upon this occasion certainly more desirable than usual, after the trouble and time which the chairman had taken to get at the facts so lucidly laid before them, to propose a vote of thanks to the chairman and board of directors, and he had therefore much pleasure in doing so.

Mr. Hinton seconded the motion, which was put to the meeting and carried unanimously.

The Chairman in responding said: On behalf of my colleagues and myself I beg to thank you. I can only assure you that this is an enterprise—submarine telegraphy—that seems to be exceedingly attractive, and just as it is attractive it entails upon us greater trouble and greater responsibility, but it is a responsibility that we feel; and we are anxious to secure even a higher object than simply good dividends—that is, to secure for the public as well as the shareholders a thoroughly efficient and beneficial system of telegraphy. That object we have in view, and I think we have fairly proved it since we took up the management of this cable. We have fairly proved that such a system can be conducted in a way that will give satisfaction both to the shareholders and the general public. As you know, it is not a large dividend which we are paying, but we have been able to continue that dividend through very trying and troublesome times, and I am still hopeful that if we continue free from competition for a little time we should even add something to it. In the meantime we must husband our resources and take very great care as far as attention and watching closely all proceedings that appear to us to concern your interests. I should add that we have the most hearty co-operation from our friend Mr. Weaver, who with his wide experience has rendered very valuable and important aid to us. I think when such experience is brought to bear—when I compare such experience as this with the prospectus which has been presented to the public—I can only say that if there is any practical knowledge that will lead our enterprises to a successful issue, I think I can say that we are able to avail ourselves of it (hear, hear).

The proceedings then terminated.

THE SUBMARINE TELEGRAPH COMPANY.

The report presented at the meeting of the shareholders of this company for the six months ending June 30th, 1882, shows a balance of profit in favour of this company of £38,516 4s. 6d., which enabled the directors, after adding 10 per cent. of the gross receipts to the reserve fund, to recommend a dividend at the rate of 19 per cent. per annum, and carry over to the next account the sum of £123 16s. 9d.

The cost of repairs to cables during the half-year have been less than in the corresponding period of the year 1881, by the sum of £1,338 12s. 2d. All the cables belonging to and worked by the company are at the present moment in good order.

In accordance with the resolution passed at the meeting of the proprietors in February last, the directors have contributed on behalf of this company and the Société Carmichael et Cie., the sum of £200 to the fund being raised for the benefit of Mr. Jacob Brett, and charged this sum and a further amount of £740, which has been granted to the widows of three clerks, lately deceased, against the revenue of the half-year.

On Tuesday the half-yearly ordinary meeting of the abovenamed company was held at the offices of the company, 2, Throgmorton Avenue, Sir James Carmichael, Bart. (chairman of the company), presiding.

Mr. S. M. Clare, secretary, having read the notice convening the meeting,

The Chairman said: Now, gentlemen, the report and accounts having been circulated for some days, I suppose you will take them as read ("Take them as read"). I have often had the pleasure of moving the adoption of the report and accounts of this company, but I do not know that I ever did so with so great a feeling of difficulty in having nothing to say to you. I have not the smallest peg on which to hang a speech. Therefore my remarks will be very few and very concise. In looking over the report you will doubtless have observed that the repairs to our cables have been lighter during the last half-year than usual. In fact, we have been very fortunate in regard to our repairs to cables. By looking at the item of salaries you will see that there is an increase of £1,690 over the corresponding half-year in 1881. Now, this chiefly arises from the very large number of messages we have carried during that period, which amounts to 100,000 in excess of the number transmitted in the corresponding period of last year. This increase has necessitated our opening and establishing eight additional circuits with the Continent, and in consequence we have had to employ fourteen additional clerks. That will pretty well account for the increase you see in the amount of salaries. I think it will be pleasing to you all to know that on the 19th of June we transmitted the largest number of messages ever sent over our wires in one day; 10,867 were sent; and during that week 58,000 telegrams, containing 751,059 words were transmitted—the best week we have had in the history of the company. I congratulate you very much upon it, and I trust business will go on as during the past half-year. I am sure you will all lament the death of our old and valued colleague, Mr. Samuel Gurney, who was, with the exception of myself, the oldest director of this company, having been elected a director in 1858. I have now really nothing else to detain you for; I have told you a short story, and one which I hope you are pleased with. I beg now to move the adoption of the report and accounts.

Mr. Forde seconded the motion and said: I congratulate you on having all your cables in good order, and I hope they will be continued so.

The Chairman then put the motion, which was carried unanimously.

The Chairman then said: I beg to move that in accordance with the recommendation of the court of directors that a dividend at the rate of 19 per cent. per annum, less income-tax on capital, be declared and paid on and after September 1st next.

Mr. C. Smith seconded.

This resolution was also put and carried unanimously.

Mr. Forde then moved that Sir J. R. Carmichael, Bart., the Hon. Ashley Ponsonby, the two directors retiring by rotation, according to the deed of settlement, be re-elected. He need add no words of commendation.

The motion, having been seconded by Mr. Jowne was carried.

Mr. C. Smith proposed that the retiring auditors, Mr. Geo. Copeland-Capper, Mr. W. R. Cole, and Alderman Sir Thos. Dakin be re-elected. He remarked that the present state of the accounts testified so very much in their favour that there was no need to say anything further.

Mr. Harvie having seconded this motion, it was also carried unanimously.

The Chairman then proposed the election of Henry R. Brand, Esq., M.P., as a director, in the room of Samuel Gurney, Esq., deceased.

The motion was seconded by Mr. G. C. Capper, and carried.

Mr. Forde proposed a vote of thanks to the chairman and the directors, congratulating them on being able to put before the meeting such a satisfactory report on that occasion.

This was seconded by Mr. Jowne, and the chairman having very briefly replied, the proceedings terminated.

UNITED TELEPHONE COMPANY (LIMITED).

The report states as follows: A reference to the capital account will show that up to 30th April, 1882, the sum of £55,966 13s. 8d. has been expended upon the works in connection with the London and Provincial Exchanges and the Stock of Instruments, being £21,739 9s. more than the outlay shown in the last balance sheet. The revenue account shows that the receipts of the company from all sources properly attributable to the year have been £42,624 15s. 3d., as against £20,644 10s. 6d. in the preceding year, or an increase of £21,980 4s. 9d. The working expenses of the year have been £21,050 4s. 3d., as againt £20,273 12s. 11d. for the preceding year, or an increase of £776 11s. 4d. The balance of net revenue is £21,945 8s. 7d., and the directors recommend the distribution of a dividend of 5 per cent. for the year, leaving a balance of £1,945 8s. 7d. to be carried forward. Subject to the approval of the proprietors, it is intended that this dividend shall be payable on the 2nd August. The above figures of themselves illustrate the progress of the business. It will be observed that whilst the working expenses have but slightly increased, the receipts have more than doubled; and the board feel that, considering the short time the company has been in existence and the many difficulties that have had to be overcome in creating and meeting a new public want, the result may be regarded as very satisfactory. As an evidence of the progress of the business it may be stated, that the numbers of subscribers to the London exchanges of the company has increased from 914 on the 30th April, 1881, to 1,673 on the 30th April, 1882. Since that date a large additional number (which is growing from day to day), have been secured. The private line business has increased from 186 lines to 366 during the year. Considering that the public are only beginning to realise the great convenience and saving of time and expense consequent upon the use of the Telephonic Exchange system, and having regard to the practical difficulty attending the erection of the necessary machinery for the efficient performance of the service, the board hope that these results will be appreciated by the proprietors. The board are happy to be able to say that they are working in harmony with the Post-office, and they feel assured that as every day must manifest, more and more clearly, how admirable and indispensable an adjunct to the work of the Post-office the telephone is, the relations with that Department will extend and become closer. The recent declaration of the Postmaster-General that the Post-office do not favour a monopoly of telephonic communication either for themselves or others is so far satisfactory, that it will enable the Department to grant the company licences for many important towns and districts from which they have hitherto been excluded pending that decision. As to the policy itself it will no doubt satisfy an abstract principle, but if widely applied it can only lead to embarrassment and serious limitation in the use and value of telephonic exchanges, which depend upon the possibility of placing the whole of the subscribers in any town or district in communication with each other. This great object will be seriously impeded by the multiplication of competitive companies (assuming any of them to possess the means of competition without infringing the rights of this company), each having a number of subscribers cut off from the subscribers of the other. The board have from time to time during the year notified to the proprietors the result of the several proceedings forced upon them for the protection of their rights. It is, therefore, not necessary to say more on the subject, than that in the Scotch case the company's position as exclusive owners of all the essential patents was explicitly and fully confirmed; whilst in the English case the validity of the Bell patents was entirely established, and the validity of the other patents practically so, the judgment being entirely in favour of the company as regards the transmitters, and only failing by reason of a purely technical point not affecting the real question. The board have taken all necessary measures both by appeal and disclaimer to remedy the failure, and they are advised that their claim to possess the only possible, as well as the best telephonic instrument, must shortly be finally established. The board, following the policy already adopted of making over to persons locally interested the management of the telephone business within the limits of particular districts, conditionally upon the formation of district companies affiliated to the parent company, have to ask the shareholders to confirm the agreements in relation to the "Telephone Company of Ireland, Limited," and the "Western Counties and South Wales Telephone Company, Limited." The general basis of the agreements under which the business is transferred is the repayment to the United Company of all sums expended by them in the districts up to the date of the transfer of the business, one-half of the ordinary capital of the district companies, and the further payment of annual royalties upon the telephones used. Negotiations are also pending for the creation of other subsidiary district companies.

On Tuesday, at noon, the second annual ordinary general meeting of the abovenamed company was held at Cannon Street Hotel, James Brand, Esq. (chairman of the company), presiding.

The notice convening the meeting having been read by the Secretary, Mr. Blaikie,

The Chairman said: Gentlemen, we have first to submit to you the report and accounts for the year ending 30th April, 1882. You have all read them and looked into the accounts, I have no doubt, and therefore I suppose you will take them as read; and it will be for me now to make a few remarks, and I will make them as few as possible, on the subject of the report and accounts. As I am not very good at making speeches I have written out what I have to say, which will occupy your time less than if I were to fumble away at a speech (laughter). As to the report and accounts I think we have made them so clear that they will require very little explanation from me, and will leave not a great deal for me to say; but I think I may fairly congratulate you on the progress we have made, and considering the large additions made to our system and the amount of work we have done, I think our capital expenditure has not been excessive. We may, at any rate, congratulate ourselves that the work for which you have paid has been good work, for notwithstanding the sinister prognostications which, I dare say all of you remember although a year and a half ago, when we were in much trouble, were made by some of those who were connected with us in the early part of our undertaking, who said that not only was our work bad, but that it would be a source of fatal mischief to the populace, and that your chairman and directors would in consequence run the risk of indictment for manslaughter. I am glad to tell you we have not had one single accident with our wires, and our works have stood the test of very heavy wind storms, perhaps the heaviest during the lifetime of any of us. That is a fair subject of congratulation. You will notice that our revenue has increased up to April 30th by nearly double; since then we have had a further very large increase of fresh subscribers coming in very fast. Our working expenses, no doubt, are heavy. They show a very small increase on last year, and notwithstanding the large increase of business our indefatigable managing director, Mr. Morgan, uses every effort to keep them down; and no doubt as we get more and more knowledge of the working of our peculiar business, and avail ourselves, as we do, of every new invention that we find out to be an improvement, we shall succeed in reducing our expenditure under this head, and we fully believe that its proportion to our income will become less and less every year. As to our modest dividend, I can say we have earned it. We could, of course, with your permission, have followed the same course we did last year and realised a part of our shares in one of our subsidiary companies, so as to make a good division in the shape of bonus. But we have considered the course we are pursuing is the best for your interests; we divide what we have fairly earned, and for the present are leaving our shares in our subsidiary companies to stand as a means of helping to earn our dividend and as a substantial reserve fund in addition to the large sum we wrote off last year against renewals, depreciation of plant, and all the troubles our business is heir to. I come now to our relations with the Post-office, which is the most important part of our business, and to the satisfactory carrying out of it. I think our report is pretty clear on that point. We are using every effort to satisfy the Postmaster-General, as well as the public, that we are able and willing to perform the services and duties we have undertaken. I believe we have given him, so far, such satisfaction that he sees no need to exercise the right reserved to him of stepping in, if necessary, and doing our work himself. We intend to make our service much more perfect. Perhaps some of you will say there is much need for that; but if you knew the difficulties with which we have to contend, you would be very lenient, I am sure. I may say on this point that if you have any complaints to make, if you will write to Mr. Morgan, our managing director, or to me, I will take the trouble to attend to it personally. We are now endeavouring to make great extensions in our work, and we hope very soon to extend the blessings of the telephone to various seaside places. I do hope that soon almost every town in Britain will be in communication with London, and I do not think it will be very long. We are getting on very well with the subscribers in Britain, and I have no doubt that business men will soon be enabled to get holidays by using the telephone, and so communicating with London. But all this involves enormous time and labour, especially in the matter of wayleaves—and that is a very difficult point—a point which, as we have to go long distances and use railways, we could scarcely overcome except with the cordial co-operation of the postal authorities. You will doubtless have seen Mr. Fawcett's statement that he did not consider he could continue to grant anything in the shape of a monopoly to any one telephone company. The monopoly we did enjoy, if it could be called a monopoly, was one of the very mildest kind, and, as I before stated, the Postmaster-General reserved to himself the right of taking our business over and doing our work himself, if we could not perform it, and I think it was more of a matter of carrying out his free trade principles, or something of that kind, that induced him to alter his previous decision, which I venture to say was the just decision, that this company, being the progenitor of the telephone work, and because the telephone business is a very difficult one to carry out, I think he made a just decision in confirming the work to be done by companies. However, as to this matter, one company alone has been able to carry out satisfactory telephone work. I am bound to say, because I believe it to be entirely true, that it cannot be satisfactorily carried out in any one town or district by more than one company or system, for independently of the trouble and difficulty created by rival candidates for subscribers and way-leaves, the benefit of the telephone would be partially destroyed, by the fact that the subscribers to one system would be cut off from communication with the subscribers to another. We have taken every pains and gone to considerable expense to ascertain the facts, and we find that since the telephone was invented in America and Europe, wherever it has been attempted to introduce two or more systems in one place, dire confusion results, and in the end, parties have been forced, either of their own accord or by the action of Government, to fuse their systems and use identical instruments. However, it has been thought fit to announce that a licence will be given to certain persons if they show themselves worthy of it and responsible; and if any persons do obtain a licence, they will first have to obtain proper instruments to carry out the business, which I think at this moment is rather a doubtful enterprise on their part. Then they will have to get subscribers; and then will commence all the real troubles of their undertaking; troubles we have undergone and are undergoing, but have successfully got over

to a very great extent. All I can say is we are not afraid of competition. We shall continue as we have done all along, honestly to develop our very great and interesting enterprise. As to our patents, which one way and another have cost us much money and anxiety and law, we have at last, I hope and think, put them on a satisfactory basis. We have from time to time fully informed you by letter of our progress in the law-suits that have been forced upon us. In Scotland we have been entirely successful, and Lord M'Laren upheld the validity of our patents to the fullest extent. The appeals which have been lodged against his decision have been withdrawn. In this country the technical objections which to Mr. Justice Fry seemed fatal to our Edison patent for a short time, were, you will be glad to hear, overcome by disclaimer on Saturday last (hear, hear). I will read you on this subject what Messrs. Waterhouse and Winterbotham say. This letter was written last night:—

"Dear Sir,—You will like to be able to report to the shareholders at the annual meeting to-morrow the present position of matters with regard to the company's patents. We may assume that they are acquainted with the contents of the circular letter of the 24th of May last in which the successful issue of the proceedings in Scotland were reported, and also the result of the more recent litigation in this country before Mr. Justice Fry, resulting in a judgment for the company on the Bell patent, but in an adverse decision on the Edison patent upon a technical question relating to the phonograph. In substance his Lordship's decision amounted to this, that Mr. Edison's claim for what is known as the carbon transmitter was a good claim and covered the instrument used by the defendants, but that Mr. Edison having included in the same patent a claim for the phonograph (which claim could not be sustained in consequence of an insufficient description of that invention in the provisional specification) the whole patent was vitiated. As the result of a very careful consideration of the question by counsel immediately after the decision of Mr. Justice Fry, it was thought well to apply at once for leave to disclaim the phonograph without waiting for the decision of the Court of Appeal on the question whether Mr. Justice Fry was right in his decision on this point or no. The case could not have been brought before the Court of Appeal until the end of the year, and although the counsel advised that the appeal would probably result in the company's favour, this was necessarily only an opinion, while a disclaimer would be decided more promptly and if obtained would dispose once and for all of the objection. The necessary application for a disclaimer was accordingly made, and we are glad to be able to report that the Attorney-General, on Saturday last, after carefully considering the whole case, granted the leave asked, and the necessary disclaimer will be forthwith filed. The only objection upon which the defendants were successful being thus disposed of Mr. Justice Fry's decision upon the patent as it now stands is on every point in favour of the company. We think therefore that you may now congratulate the company upon having two patents which have stood the most searching and hostile criticism which the ingenuity of the legal and scientific mind can bring to bear upon them, and although it is of course possible that the great value attaching to these patents may induce some adventurous persons to carry the litigation to a higher court (if they can induce the public to find the money for the purpose) we have every confidence that they will fail in reversing the decisions which have already been given. We are, dear Sir, yours faithfully,

"Waterhouse & Winterbotham."

I think that announcement is a very gratifying thing to all of us. To show you a little more how the decision will act, we telephoned Messrs. Waterhouse and Winterbotham, and they say that some of our opponents have been attempting to get up a company to do this business, and they said that they had Hunnings' transmitter to use in conducting the business. This transmitter we were advised of as being a childish infringement upon our Edison patent. When we lost the action to a certain extent, of course this Hunnings' transmitter was open to the public for a time, and these gentlemen immediately seized the opportunity to manufacture an enormous quantity of them, so that whether he won or lost eventually they would be able with the proceeds of the articles they took from us,—to use a mild term,—to enter into competition with us. But, however they may have benefited, our disclaimer of Saturday protects us. As to the *bona fides* of the contract, this will be referred to the Attorney-General, and, no doubt, upon such a question he will give a fair decision, as satisfactory as possible to both parties. I do not know whether you expect me to say a word as to what is the value of our business, and so forth. Of course I have no wish to induce any one to invest in telephone securities, but to our shareholders I would say, under no circumstances should you be in a hurry to part with your property, and although we have only as yet been able to pay a small dividend, you must not forget that our enterprise still is a very new one. We have overcome Government difficulties, and I am certain that we are on the eve of overcoming much greater difficulties. We may yet meet with, of course, opposition and trouble of every kind. In our progress through life we are entitled to expect that, but I do not waver from the constant belief I have always entertained that the United Telephone Company will triumph. As it has hitherto done over the obstacles in the past, so we shall triumph over the obstacles in the future; and there is no kind of doubt that against any kind of opposition or competition from any and every source we shall continue to carry on business, as we have done, with our utmost efforts and our greatest anxiety for the interests of the shareholders that have been confided to us, and I am certain we shall prosper and triumph and prevail in the end. I do not think that I have anything more to say, but I have to move that the report be taken as read and received and adopted. Of course, if any gentleman wants to ask any questions at all about anything connected with the business, all of us shall be only too happy to afford the fullest information in our power.

Joseph Forbes, Esq., seconded the motion.

Mr. Galsworthy said that the report must appear almost too satisfactory. The revenue for the year had been £42,624, against £20,644 for the previous year, or more than double; whereas the expenses, although heavy, had only increased by £766. If they went on like that they ought to have a very good dividend next year. The number of subscribers had increased from 914 to 1,673, which seemed a capital index of prosperity, as it meant the doubling of the business in twelve months. It appeared too that it was a practical impossibility for them to have any competition. Just let them imagine a dozen telephone companies in London! If they were brought out he had no doubt that the public would take shares; but what a state of confusion would result if there were a dozen sets of subscribers none of whom were able to communicate with any of the others. He believed entirely in the policy which the directors were carrying out—that of keeping the dividend down to a moderate sum. Those of them who held shares as an investment did not want to run the shares up in the market; they hoped, indeed, for a larger dividend next year; but their first business was to put the company on a permanent and stable basis as a business concern.

A shareholder asked what was the increase of subscribers since the date to which the report was made up?

The Chairman said that he was glad to say that since April 30th, to which date the report supplied the figures, the number of subscribers had increased from 1,673 to 1,924 (hear, hear), and they were running their wires twice as quick as they used to do. Mr. Morgan being at it all day long had found out a way of working that was far better than the old one. With regard to the increase of expenditure over last year he might say that they had satisfied themselves that their income would steadily increase, and, with their management, the expenditure would not, he thought, show any very large increase. He would ask Mr. Morgan to read a summary of the work they did during the past three months for the satisfaction of the shareholders.

Mr. Morgan read a tabular statement which showed the orders received in the first three months of 1880 to have been 90; in 1881, 238, and in 1882, 319. Lines opened:—In first three months of 1880, 75; in 1881, 196; in 1882, 395. Average calls per subscriber:—In 1880, 4·28; in 1881, 5·16; in 1882, 6·88. Total calls during the year 1880, 943,831; in 1881, 2,313,000; at the present time close upon 4,000,000. Subscribers on 30th April, 1881, 914; on 30th April, 1882, 1,673; present time, 1,924. The rate of opening the wires had averaged 100 a month since last October. During June last 130 wires were opened. The number of exchanges in 1880 was 7; four more were opened in 1881, three more in 1882, and during the last three months an additional exchange had been opened at Smithfield, making a total number of 15.

The Chairman: The first resolution is that the report of the directors for the year ending April 30th, 1882, be taken as read, received, and adopted.

James Staats Forbes, Esq., seconded the motion, which was carried unanimously.

The Chairman: The second resolution is that a dividend of 5 per cent., less income-tax, on the paid-up capital for the year ending April 30th last, be now declared.

Mr. Forbes seconded the motion.

Mr. Galsworthy said that it was very inconvenient to pay income-tax on the dividend, and he thought it would be better to declare it free of income-tax.

The Chairman said that they had taken their usual course, but they would remember the suggestion next year.

The resolution was then put to the meeting and carried unanimously.

The Chairman: Resolution 3 is that Messrs. John W. Batten, Joseph B. Morgan, and Col. Gourand, who retire from the Board by rotation, be re-elected.

Mr. Forbes seconded the motion, but suggested that the names should be put to the meeting individually.

This was accordingly done, and the three gentlemen were unanimously re-elected.

Mr. Garrett asked if there was any objection to having half-yearly meetings?

The Chairman: Personally I have the very greatest objection to half-yearly meetings, because I have to make speeches, and that is a dreadful task (laughter). Don't you think a circular every half year would answer the purpose? We will consider it, of course. If the question is one of having an interim dividend it may be a course to be adopted.

Mr. Agnew, M.P., then moved that the auditors, Messrs. Quilter, Ball & Co., and Messrs. Price, Waterhouse & Co., be re-elected at a remuneration of fifty guineas each per annum.

Mr. Galsworthy seconded the motion.

Mr. Garrett asked if it was necessary to have two professional auditors in a company of this kind?

The Chairman said that that was a matter which rested entirely with the shareholders.

Mr. Garrett said that it was solely a question of keeping the expenses down.

Mr. Agnew thought that if they employed one auditor only they would probably have to pay him 100 guineas; the existence of two auditors was an additional security.

The resolution was then put to the meeting and carried unanimously.

The Chairman: The next resolution is that this meeting confirms (subject to such modifications as the directors may think fit to make) the agreements with Mr. Arthur Dudgeon and with Mr. George Hunter Robertson, dated respectively the 22nd March, 1882, and the 31st March, 1882, for granting in the first case to a company formed under the name of "The Telephone Company of Ireland (Limited)," and in the second case to a company intended to be formed under the name of "The Western Counties and South Wales Telephone Company, Limited," exclusive licences for the use of the company's patents in certain districts, partly in consideration of fully

paid-up shares in such respective companies and partly in consideration of royalties, and in connection with such licences to sell for fully paid shares and cash any business now carried on by the company within the districts comprised in such licences respectively and any property used in such business. These are two more companies formed upon the basis of the Lancashire Telephone Company and the National Telephone Company, which are going on, I think I may say, in a fairly satisfactory way, and which I hope will be of even more value to us than they are now. The capital of the Irish Company is £200,000, £25,000 being in preference shares of £10 each, and £175,000 in ordinary shares of £1 each, of which the United Telephone Company receives £87,500 in shares. The amount to be repaid to us in cash for the expenditure already incurred in Dublin and elsewhere in forming the nucleus of this business, now selling, is about £5,500. As to the Western Counties Company we propose a capital of £275,000, of which £25,000 is in preference shares of £5 each, and £250,000 in ordinary shares of £1 each, of which the United Company receives £125,000, and the amount to be repaid in cash for the expenditure is about £6,000. I think it is necessary for you to pass these resolutions in order to enable us to get these companies floated.

Mr. Galsworthy asked if the Western Counties Company was yet founded?

The Chairman said that it was as good as founded. But for some little hitch it would have been completed before this time.

A shareholder would like to ask a question, but would not press it if it was in any way inconvenient to the board to answer it. What hold had they got in the provinces at present, how many subscribers had they there, what towns they served, and whether they were sufficiently strong in those towns to hold their own against any rivals, as he understood they could do in London?

The Chairman said he could not go into these details, because they did not properly belong to them. The property in the provinces belonged to the Lancashire and Cheshire Company, the National Company, and the Northern Company. He thought they were fairly strong in all the towns they had the licence for. They had not yet succeeded in getting licences for all the places they should like, but the new decision of the Postmaster-General would enable them to have licences for every place not licenced. The Chairman of the National Company, who was present, could doubtless give the fullest information on the subject.

Mr. Forbes then seconded the resolution.

In reply to a question by Mr. Galsworthy as to the disposal of the South Western Counties Company's stock, the Chairman said that they got one-half (£125,000) of the issue: the local company distributed the other half to people useful in forming the company, to men who were owners of collieries and tin works and so forth, who would be likely to employ the telephone.

Mr. Agnew, M.P., said that the chairman had stated that he had not the gift of making a speech. He had heard from time to time oratorical speeches from the chair, yet he was glad to say that he had never heard a better speech than that read at this meeting. The chairman and his colleagues had manned the ship and piloted it through the troubled waters, and he thought the shareholders must agree with him that they were somewhere near the promised land at last. He was sure that the chairman and the other members of the board had given to this enterprise time and energy to the disadvantage, he believed, in many cases of their own personal affairs, and he thought that the shareholders were greatly indebted to them for the patient labour and care which they had devoted to the interests of the company. He begged to propose that their thanks be given to the chairman and the members of the board for their attention to the shareholders' interests, and for the position which their report upon this occasion showed that the company occupied.

Mr. Forbes would second that part of Mr. Agnew's motion referring to the chairman. He did that as a shareholder, first, to be within his right, and in the second place, because from his association with the chairman from the very inception of that business he was perhaps a better judge, and one more entitled from personal knowledge of his qualities than perhaps any outsider living. Their chairman had that characteristic of all strong and big men—exceeding modesty (laughter). He stated that he could not make a speech, yet they saw that he could. He could say of him that a more earnest, courageous, honourable man did not exist in the City of London; and he had besides that great quality without which no great enterprise was ever pulled through, however ably it might be conceived—pluck and entire faith in what he was about. He had no hesitation in saying that but for the possession by him of these qualities in more than an ordinary degree, this company would not have been in so good a position as it was in to-day. If it had lived through early divisions and great discouragements, that was owing a great deal more than he could describe to the qualities of their excellent chairman. Therefore he felt privileged in being allowed, as far as the chairman was concerned, to second the motion before the meeting.

Mr. Galsworthy said that nothing was more difficult to manage than a telephone company. Directors were overwhelmed with details and practical difficulties of all kinds, therefore all the more credit was due to the chairman of the board for the good position which the company now occupied. He was very glad indeed to see that their friend Mr. Batten was re-elected, because there was enough law in his head to pull them right through any of their difficulties. Whether they looked at the board as a whole or as individuals they must feel great confidence in their skill and ability.

A shareholder asked under what item the law expenses for the year were included.

The Chairman said that the legal expenses were included under two heads in the accounts—£4,702, and the remainder shown in the balance sheet as £350. There were no other legal expenses save those connected with defending their patents.

Mr. Joseph Dodds, M.P., said that he did not understand that the resolution had been seconded except in so far as the chairman was personally concerned. He had much pleasure in supplying that defect before putting the resolution to the meeting. With regard to the speech of the chairman, he could say, like his friend near him, that though he had attended a great many meetings of shareholders and public meetings of various kinds, he never, in the whole course of his experience, heard a more comprehensive, clear, business-like statement than that put before them by the chairman. He had much pleasure in seconding the motion, and a vote of thanks to the directors generally.

The motion was then put to the meeting and carried unanimously.

The Chairman said that, on behalf of his colleagues and himself, he had to thank them very much. They could certainly take to themselves the praise that they had endeavoured to do their best, and he could assure the meeting that they would endeavour to do their best for the future. They wished to do all that was possible, and if they had failed in any way it was because they had not the ability, not because they had not the will (hear, hear).

The proceedings then terminated.

SETTLING DAY AND QUOTATION.—For these application has been made to the Stock Exchange Committee, in the case of the South African Brush Electric Light and Power Company (Limited). Shares.

QUOTATION has been granted to the Brush Electric Light and Power Company of Scotland (Limited).

W. T. HENLEY'S ELECTRIC LIGHT AND POWER COMPANY.—A call of 10s. became due on the shares of this company on the 1st. inst.

LATEST QUOTATIONS.

Authorised Issue.	Share.	Name.	Paid.	Closing Quotations. Aug. 2.	Business Done.
		ELECTRIC LIGHT.			
40,000	10	Anglo-American Brush Co.	4	17 - 18	16⅞.17.16⅞.17 .16⅞
		Do. Do.	10	33 - 40	38.39½
30,000	5	Brush Electric Light & Power Co. (Scotland)	2½	⅜ - 1½	⅜
150,000	1	Electric Light and Power Generator Co.	1	⅜ - ½	½
25,000	5	Great Western Electric Light & Power Co.	2½	¼ - 1	7.¼.7.⅛.⅛.7 .¼
24,980	5	Hammond Electric Light & Power Supply Co.	2½	7 - 8	
40,000	5	Indian & Oriental Electrical Storage Works Co.	2	1⅛ - 2¼	
40,000	5	Pilsen, Joel & General Electric Light Co.	2	1½ - 2	
		TELEGRAPHS.			
2,116,400*l.*	Stk.	Anglo-American, Limited	100	49 - 50	
2,441,800*l.*	Stk.	Do. Preferred Def'd. receiving no div until	100	79 -80	79⅜.¼
2,441,800*l.*	Stk.	Do. Deferred 6 p. c. has been paid to Pref.	100	19 - 20	19¼
130,000	10	Brazilian Submarine, Limited	10	11⅜ - 11½	
16,000	10	Cuba, Limited	10	9⅛ - 9½	
6,003	10	Do. 10 per cent. Preference	10	15½ - 16½	
13,000	10	Direct Spanish, Limited	9	6 - 6½	
6,000	10	Do. 10 per cent. Preference	10	15½ - 16½	
65,000	20	Direct United States Cable, Limited, 1877	20	11½ - 12	11¼
100,000*l.*	100	Do. 6 per cent. Debenture, repayable 1884	100	101 -104	101¼.2¼
380,000	10	Eastern, Limited	10	10¾ - 10⅞	10¾.¼ xd.
70,000	10	Do. 6 per cent. Preference	10	12¾ - 13	
232,000*l.*	100	Do. 6 do. Debentures, repayable Oct. 1853	100	99 -102	
200,000*l.*	100	Do. 5 do. do. Aug. 1887	100	100 -103	101¾ xd.
200,000*l.*	100	Do. 5 do. do. Aug. 1899	100	100 -105	xd.
199,750	10	Eastern Extension, Australasia & China, Limited	10	11¼ - 11⅝	xd.
320,000	100	Do. 6 p. c. Debentures, repayable Feb. 1891	100	104 -107	
500,000	100	Do. 5 p. c. (Australian Gov. Subsidy) Deb. 1900	100	102 -105	
140,000	100	Do. do. registered, repayable 1900	100	102 -105	
100,000*l.*	100	Do. 5 per cent. Debenture, 1890	100	102 -105	
254,300*l.*	100	Eastern and South African Limited 5 per cent. Mort. Deb. Registered redeemable 1 Jan. 1900	100	101 -104	103
345,700*l.*	100	Do. do. do. To Bearer	100	101 -104	103
22,050	10	German Union Telegraph and Trust, Limited	10	9¾ - 10¼	6⅞.7⅛.7 xd
163,390	10	Globe Telegraph and Trust, Limited	10	6⅞ - 6⅞	
163,209	10	Do. 6 per cent. Preference	10	12¼ - 12⅝	12⅜.¼.⅜.¼
125,000	10	Great Northern	10	12¼ - 12⅝	
100,000*l.*	100	Do. 5 per cent. Debentures	100	100 -103	
31,200	10	India-Rubber, Gutta-Percha and Telegraph Works	10	25 - 26	
100,000	100	Do. 6 per cent. Debentures, 1886	100	101 -105	
17,000	25	Indo-European, Limited	25	28⅛ - 29¼	
38,148	10	London Platino-Brazilian, Limited	10	4¼ - 5	
12,060	10	Mediterranean Extension, Limited	10	2 - 2¼	
8,200	10	Do. 8 per cent. Preference	10	8¼ - 9	
9,000	8	Reuter's, Limited	8	12¾ - 13¼	
280,000	Stk.	Submarine	100	265 -275	
58,225	1	Do. Scrip	1	2½ - 2¾	
4,200	Cert.	Submarine Cables Trust	100	.. ..	
37,350	12	Telegraph Construction and Maintenance	12	28 - 29	
150,000	100	Do. 6 per cent. Bonds, 1884	100	102 -104	
186,750	5	Do. 2nd Bonus Trust Cert.	5	1¼ - 1⅜	
30,000	10	West Coast of America, Limited	10	4¼ - 5¼	
150,000	100	Do. 8 per cent. Debentures	..	.. ..	
69,910	20	Western and Brazilian, Limited	20	6¾ - 7¼	
200,000*l.*	100	Do. 6 per cent. Debentures "A" 1910	100	104 -107	
2,500	100	Do. 6 p.c. Mort. Deb. series B of '80, red. Feb., 1910	100	97 -100	
1,500	$1,000	Western Union of U. S. 7 p.c. 1 Mort. (Building) Bds.	$1,000	123 -128	
1,030,000*l.*	100	Do. 6 per cent. Sterling Bonds	100	103 -106	
88,321	10	West India and Panama, Limited	10	1¼ - 1⅜	1⅜
34,563	10	Do. 6 per cent. 1st Preference	10	8¼ - 8⅝	
4,669	10	Do. 6 do. 2nd do.	10	6¾ - 7	
		TELEPHONES.			
154,165	1	Con. Telephone & Maintenance, Ld. Nos. 1 to 154,165	1	1⅛ - 1⅜	1¼
200,000	1	Oriental Telephone Co., Nos. 100,000 to 300,000	¼	⅜ - ½	
100,000	5	United Telephone Co.	5	11¼ - 12½	11¼.¼.¼.12.¼

TRAFFIC RECEIPTS.

Western and Brazilian Telegraph Company (Limited). The traffic receipts for the week ending July 14th. 1882. were £1,828, after deducting the "fifth" of the gross receipts payable to the London, Platino-Brazilian Telegraph Company (Limited).

West Coast of America Telegraph Company (Limited). The gross earnings, traffics and steamer, for the first half of July are £1,825, against £1,675 in the corresponding period last year.

West India and Panama Telegraph Company (Limited). The estimated traffic receipts for the half-month ended the 15th July are £2,521, as compared with £2,135 in the corresponding period of 1881. The March receipts, estimated at £7,345, realised £7,459. For the half-month ended the 31st July are £2,400, as compared with £2,017, in the corresponding period of 18 . The April receipts, estimated at £6,958, realised £6,990.